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Northeastern University

Undergraduate Catalog

Full-Time Day Programs

1993 | 1994



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1993-1994

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*Courses in Health, Sport, and Leisure Studies are administered through the Bouvé College of Pharmacy and Health Sciences. Students matriculated for a degree in this area prior to the time of consolidation may, until June 1997, opt to receive the degree from the Bouvé College of Human Development Professions.

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The University

Admissions

Learning about Northeastern

The Department of Undergraduate Admissions encourages prospective students to learn more about Northeastern University. For more information on the following programs, or to receive additional publications, contact the department at 617-373-2211 (voice), 617-373-4019 (TTY), or 617-373-8780 (fax). Or write: Department of Undergraduate Admissions, 150 Richards Hall, Northeastern University, Boston, Massachusetts 02115.

Information sessions. These sessions are scheduled on Monday through Friday year round (except for legal holidays). They include presentations by an admissions counselor, an informal question-and-answer period, and a multimedia presentation. The sessions are also held on Saturday mornings in the fall and spring.

Interviews. All prospective students are encouraged but not required to schedule a personal interview. The interview allows students to meet with an admissions counselor and to learn more about the University's academic and cooperative education programs.

Guided tours. Student-guided tours of the campus are held Monday through Friday and on Saturday mornings in the fall and spring. During July and August tours are held on Monday through Friday. Tours begin at 10:00 a.m. and leave on the hour, with the final tour at 3:00 p.m. Both the admissions information session and the tour may be scheduled in advance by contacting the admissions department.

College visit program. Prospective students and their parents have the opportunity to visit any one of the undergraduate colleges and schools through the college visit program. Visits are scheduled so that prospective students and their parents may participate in the information session and university tour on the same day.

Open houses. During late winter and early spring, each of Northeastern's undergraduate colleges invites prospective students and their parents to an open house. Representatives of various University departments provide information about admissions, cooperative education, financial aid, residential life, student activities, and the University libraries, among other areas.

Admissions Policies

Northeastern University admits qualified freshmen and transfer students to all programs in September and January. In most programs, transfer students also may apply for entrance at the beginning of the March and June quarters.

Rolling admission. Decisions on admission are made as soon as all of the required credentials (including first marking-period senior grades and College Board or ACT test scores) have been submitted and reviewed. In all cases of acceptance, candidates must complete their senior year of high school. Admission is selective and priority is given to candidates who apply by March 1.

Early admission—juniors, second-semester seniors. In certain cases, students may enroll at Northeastern before graduating from high school. Such students may enroll in either September or January, thereby reducing by one year the time to complete degree requirements. The endorsement of the student's school principal or guidance counselor is required for early admission.

Deferred admission. Accepted students who wish to participate in the deferred admission plan will be asked to describe the activities they plan for the year preceding enrollment. Students may choose this plan for reasons such as travel, health problems, or work.

Required deposits. Students who are accepted to the University are asked to submit a nonrefundable tuition deposit of \$100 by May 1. This deposit indicates intent to enroll and is applied to the first-quarter tuition account. Students applying for entrance dates other than September should note the required deposit date on their certificates of acceptance. For additional information about deposits required for international students, refer to the International Students section on page 4.

Students interested in on-campus housing must submit a nonrefundable \$400 deposit (in addition to the \$100 tuition deposit) along with a completed housing application form. Information about this required nonrefundable deposit is mailed by the Department of Residential Life to all admitted students following acceptance.

Entrance Requirements

Ideally, applicants have completed an academically challenging secondary school program—one that includes courses in English, mathematics, laboratory science, history, and a foreign language. Candidates should also have read broadly outside of class and developed an ability to communicate ideas effectively. Achievement in secondary school is the best single predictor of academic success in college. This factor, together with recommendations from the student's school counselor, and Scholastic Aptitude Test (SAT) or American College Testing Program (ACT) test results, weigh most heavily in the evaluation process.

Secondary School Preparation

Arts, Humanities, and Social Sciences. Students who plan to major in art, theatre, English, foreign languages, music, philosophy, and speech communication should have demonstrated ability in these areas during high school. Candidates who plan to pursue careers in anthropology, economics, history, human services, linguistics, political science, psychology, or sociology should have a well-rounded background in the social sciences. Applicants to the School of Journalism should have worked on writing and producing high school publications or audio- or videotape productions.

Students seeking certification as teachers in early childhood education or elementary education or those planning to major in human services should have demonstrated interest in the behavioral, social, and human sciences.

Business administration. Candidates must have completed a strong preparatory program that emphasized the humanities, social sciences, and natural sciences. Applicants also must have had several years of mathematics, including geometry and Algebra 1 and 2.

Computer science, engineering, mathematics, nursing, pharmacy and health sciences, and sciences. Applicants are encouraged to complete a full sequence of science and mathematics courses. In science, such a sequence usually includes a year of study and laboratory work in biology, chemistry, and physics; and, in mathematics, the sequence includes geometry, Algebra 1 and 2, and a fourth year of trigonometry and/or analysis. Math and science majors also need courses in the social sciences and humanities.

Criminal justice. Applicants should have demonstrated the ability to succeed in their study of the behavioral, social, and human sciences.

Engineering technology. Applicants are encouraged to complete a full sequence of mathematics, including geometry, Algebra 1 and 2, and analysis; and a full year of study and lab work in a natural science. Candidates also need courses in the social sciences and humanities.

Entrance Examinations

Freshmen must take the Scholastic Aptitude Test (SAT) of the College Board or the American College Testing Program (ACT). Results of these tests may be sent directly to the admissions office. The College Board code number for Northeastern University is 3667. When evaluating candidates the admissions office will consider the two best scores a student submits, regardless of test date. For more information, consult a school guidance counselor or write directly to The College Board, P.O. Box 592, Princeton, NJ 08540 or P.O. Box 1025, Berkeley, CA 94701. Or write to American College Testing Program, P.O. Box 168, Iowa City, IA 52243.

English-as-a-Second-Language Proficiency Requirement

Before being considered for admission, students whose native language is not English are required to demonstrate some English language proficiency. This can be done by submitting the results of the College Board's Test of English as a Foreign Language (TOEFL), by successfully completing an approved English-as-a-second-language course of study, or by being enrolled in such a course.

Before they are allowed to enroll in academic coursework, all students whose first language is not English and who score below 550 on the TOEFL (or its equivalent on another examination) must take the English Proficiency Test administered by the University's English Language Center. The results of this test are used to assign students to appropriate English courses.

Advanced Placement

The University grants advanced placement credit to applicants with a score of 3 or better in their advanced placement examinations. Applicants may take the tests in art (history, studio—general, studio—drawing), biology, chemistry, computer science (A, AB), economics (microeconomics, macroeconomics), English (language, literature), French (language, literature), German (language), government and politics (comparative, United States), history (European, United States), Latin (Virgil, Catullus—Horace), mathematics (calculus AB, BC), music (theory), physics (B,C mechanics—C electricity, magnetism), and Spanish (language, literature). Applicants who wish to submit scores for advanced placement are required to take the Advanced Placement Tests of the College Board in May.

College-Level Examination Program

The University cooperates with the College Board in its College-Level Examination Program. CLEP provides a national program to evaluate nontraditional college-level education. Northeastern will grant college credit to qualified students according to their CLEP scores. Northeastern is a designated CLEP Testing Center. For more information, contact the Counseling Center at 302 Ell Student Center, 617-373-2142.

Health Requirements

The Lane Health Center’s Pre-entrance Physical Examination Form is sent to each student following acceptance at Northeastern. Completion of this form is considered a condition of enrollment. Each applicant must return the completed form, which includes a medical history, documentation of a recent physical exam, and a tuberculin test, within six months of registration.

State law requires medical documentation of appropriate immunization against measles (two vaccinations), mumps, rubella, tetanus, and diphtheria. Both a rubella and a varicella titre are mandatory for the health professions (medical laboratory science, nursing, pharmacy and health sciences, radiology, and physical therapy). Tuberculin tests are required annually for nursing students and within three months prior to the practicum for student teachers. Junior-year physical therapy students are required to obtain clinical clearance from the Lane Health Center. A positive titre for Hepatitis B is required prior to beginning any clinical assignments, internships, or cooperative education quarters for all undergraduate students deemed at risk by their departments and in pharmacy and health sciences and nursing.

In accordance with Section 504 of the Rehabilitation Act of 1973, applications for admission are judged on the basis of qualification, not on the absence or presence of a medical or disabling condition. Any adjustments needed for such applicants are made to ensure access to college life, both academic and extracurricular.

How to Apply
All Students

The application process for all students follows. Refer to the International Students section and the Transfer Students section for additional requirements.

- Complete and sign the application form.
- Enclose the nonrefundable \$30 application fee. Make checks payable to Northeastern University. This fee may be waived in cases of extreme hardship as endorsed by the candidate’s secondary school counselor or social worker.
- Mail the application form and the check to the Department of Undergraduate Admissions, 150 Richards Hall, Northeastern University, Boston, Massachusetts 02115.
- Arrange for transcripts and required test scores—Scholastic Aptitude Test (SAT) or American College Testing Program (ACT)—to be sent to the University. (Transfer students who have completed two years of college do not have to submit test scores.)
- For priority consideration, applications should be submitted by March 1.

International Students

The University welcomes qualified students from other countries. At present, nearly 2,500 international students from more than 115 countries attend Northeastern. The University is authorized under federal law to enroll nonimmigrant aliens as full-time students in degree-granting programs.

In addition to the application process described above, international students must complete the following.

- Submit the Supplementary Form for International Applicants, according to the following schedule.

Entrance date	Application deadline
Fall quarter (freshmen and transfer students)	March 1
Winter quarter (freshmen and transfer applicants)	September 1

- Submit the same credentials as U.S. citizens. All credentials must be official documents or certified true copies. Credentials in languages other than English must be accompanied by certified literal English translations. Applicants with previous university-level studies should submit official course descriptions or syllabi for all coursework completed.
- Demonstrate English language proficiency if their first language is not English. See page 3 for details about fulfilling this requirement.
- After acceptance, submit the required tuition deposit of \$100 and the University’s Declaration and Certification of Finances Form by the date specified on the acceptance certificate. Upon receipt and approval, a Certificate of Eligibility (I-20 form or IAP-66 form) will be issued.
- If students are transferring to Northeastern from another college or university in the United States, one of the following is required. Students returning home before entering Northeastern must re-enter the United States on the I-20 or IAP-66 issued by the University. Students not returning home must present the Northeastern-issued I-20 or IAP-66 to the International Students Office during registration and orientation.

The University considers awarding advanced standing credit to students whose secondary-school education exceeds the requirements met by students in the American educational system. The University recognizes the advanced level of academic preparation offered by the International Baccalaureate. Up to one year of credit is generally granted for scores of 5, 6, or 7 on higher-level examinations, as applicable to the degree being pursued.

Transfer Students

Students who have completed one or two years of study in an accredited college, university, or technical institute or have earned an associate’s degree from an accredited junior college or other two-year program may seek admission as an upperclass student.

Transfer students may request advanced standing credit as upperclass students on the basis of acceptable credits earned in an accredited two- or four-year institution or a technical institute.

Basic requirements. Transfer applicants must have achieved a satisfactory college record—appropriate to the course of study they wish to pursue—at another institution. Credit is generally granted toward a Northeastern degree for a grade of C (2.0) or better in any reasonably equivalent course completed at another accredited institution. Candidates must be in good standing and must be eligible to continue in the institution they are currently attending.

Northeastern University uses the quarter calendar and awards quarter hours of credit for courses that are successfully completed. Each quarter hour (QH) of credit is equivalent to three-quarters of one semester hour. Most Northeastern courses are equivalent to three semester hours of credit or four quarter hours. Students who successfully complete 48 quarter hours generally qualify for sophomore standing, 80 for middler, 112 for junior, and 148 for senior. All upperclass course selection for transfer students is planned with their faculty advisers.

Application procedure. Transfer applicants should follow the application process described on page 4, with the exception that the SAT or ACT is waived for students who have completed 60 semester credit hours of college work successfully. In addition, transfer candidates must

- indicate their choice of college and major on the application;
- request that an official transcript from each college attended be sent to the Department of Undergraduate Admissions directly from the registrar's office of the respective colleges;
- submit a list of courses in progress for the current academic year (including course number, course title, and number of credits to be earned in each course);
- demonstrate English language proficiency if their first language is not English. See page 3 for details about fulfilling this requirement.

The deadlines for transfer applications are:

Entrance date	Application deadline
Winter quarter	November 1
Spring quarter	February 1
Summer quarter	May 1
Fall quarter	July 1

Cooperative Education

Robert E. Vozzella, EdD, *Dean*

Candace A. Herene, BA, *Interim Assistant Dean*

Patricia A. Venter, BS, *Minority Liaison*

Professor

Robert W. Miller, MEd

Associate Professors

Boreslaw P. Berestecky, MEd
Betsey W. Blackmer, PT, EdD
Richard L. Canale, MEd, CAGS
Elizabeth A. Chilvers, MEd
Robert D. Deforge, RPh, DPh
Kathleen L. Finn, RN, EdD
Joyce K. Fletcher, MEd
Mary R. Flynn, RN, MEd
Stephen M. Kane, EdD
Ann C. Noonan, PT, EdD
Melvin W. Simms, EdD
Robert R. Tillman, EdD

Assistant Professors

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Donald L. Eastridge, MDiv
Ann M. Galligan, EdD
John C. Mulhall, MS
Veronica L. Porter, MEd
John A. Saltmarsh, PhD
William A. Sloane, MBA

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Rosemarie DiMarco, MS
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Terry H. Chapman, PhD
Patrick Hickox, MArch
Karen P. Kelley, MEd
Jill E. Lacey, MS
Helen C. Mann, MEd
Martha Orozco, JD
Paula Schrank, MEd
Jacqueline F. Sweeney, MS
Martha L. Wengert, MEd
Felicia P. Wiltz, MEd
Aaron Wizel, MS
William E. Wray, JD

Cooperative education is based on the principle that what students learn in the workplace is a valuable complement to what they learn in the classroom. For most programs, cooperative education is a degree requirement. The University assists in providing cooperative work experiences and attempts to integrate these experiences into the students' total academic program. The success of the program, however, ultimately depends on student interest and commitment and the cooperation of educators and outside agencies.

Studies show that reinforcing classroom learning with job responsibilities increases a student's motivation and self-confidence. Greater interest in academic work develops when students are able to see the link between co-op experiences and classroom principles. Co-op students are usually able not only to better evaluate career decisions early in their college years, but also to gain meaningful work experience before graduation and to establish valuable professional contacts and references. The salaries students earn in cooperative education experiences may also help defray a portion of the costs of their education.

Participation in co-op is required of all students except those in the College of Arts and Sciences. Although most arts and sciences students choose to take advantage of co-op, the college offers a full-time program without co-op.

Cooperative education curricula leading to the baccalaureate degree generally require five years at Northeastern University. Programs typically consist of a freshman year of three consecutive quarters of full-time study followed by four upperclass years in which students alternate periods of classroom study with cooperative education experiences. The colleges of Engineering, Business Administration, and Computer Science offer a four-year co-op option.

Responsibility for all phases of the co-op program rests with a faculty coordinator who assists students in deriving maximum benefits from their education at Northeastern. In general, co-op experiences can become increasingly challenging and career-specific as students continue their education and acquire greater skills.

Students are not limited to paid employment during a cooperative period. They may wish to pursue a wide variety of experiential learning activities such as travel abroad, volunteer work, or taking specialized courses at another institution.

The Office of International Cooperative Education offers a variety of services to international students as well as U.S. citizens. Through the International Exchange Program, undergraduates may be placed abroad for their cooperative work experience. Placements abroad are currently available in the United Kingdom, Ireland, France, Spain, Germany, Austria, the Netherlands, Sweden, Australia, and Israel for students who have the appropriate background and experience.

International Cooperative Education

International students may receive assistance on matters relating to their co-op employment, such as Social Security and tax information, as well as on issues involving the verification of their immigration and co-op status. A special course, Working in the U.S., is offered to international students to help prepare them for co-op. Additionally, new opportunities may enable some international students to return to their home countries to work for American companies on co-op, especially those companies located in the Pacific Rim region.

Academic Policies

This section presents general information about what is expected of students and how progress toward matriculation is measured. For specific details on their individual degree programs, students should consult their academic advisers.

The University assumes no liability for any delay in providing or failing to provide educational or related services or facilities due to causes beyond the reasonable control of the University. Causes include, but are not limited to, power failure, fire, strikes by University employees or others, weather damage, and acts of public authorities. However, when in its judgment it is appropriate to do so, the University will exert reasonable efforts to provide comparable or substantially equivalent services, facilities, or performance; but its inability or failure to do so shall not subject it to liability.

No faculty member, administrator, or other representative of the University shall make any representations to, or enter into any agreements with, or act toward any student or other person in any manner that is not in conformity with established University policies, practices, and procedures as expressed in this or any other official University document.

Attendance Requirements

The University expects students to meet attendance requirements in all courses to qualify for credit. Attendance requirements vary; it is the student's responsibility to ascertain what each instructor requires.

Failure to meet attendance requirements may force a student to drop the course, as recommended by the instructor and with the approval of the Academic Standing Committee of the college.

Classes for day students are scheduled from 8:00 am to 5:10 pm, Monday through Friday. Students should not make conflicting commitments until the class schedules for each quarter are final. Schedule changes to accommodate part-time work are difficult and rarely made.

Permission to make up work may be granted by instructors for reasonable cause. Requests must be made immediately upon a student's return to class. Laboratory work can be made up only during the hours of regularly scheduled instruction.

Absence because of student activities. If students must miss classes to participate in athletic contests or other forms of scheduled intercollegiate activity, they are entitled to make-up privileges. Faculty members may require a written statement from the administrator in charge of the activity.

Absence because of illness. A student who is absent from school for an extended period of time must inform the dean of students of his or her college by letter, message, or telephone.

Absence because of religious beliefs. The University maintains the following guidelines regarding student absences because of religious beliefs. "Any student who is unable, because of his/her religious beliefs, to attend classes or to participate in any examination, study, or work requirement shall be provided with an opportunity to make up such examination, study, or work requirement which he/she may have missed because of such absence on any particular day; provided, however, that such makeup examination or work shall not create an unreasonable burden upon such school. No fees of any kind shall be charged by the institution for making available to the said student such opportunity. No adverse or prejudicial effects shall result to any student because of availing himself/herself of the provisions of this section" (Massachusetts General Laws, Chapter 151C, Section 2B, 1985).

Absence because of jury duty. Members of the University community are expected to fulfill their obligations to serve on a jury if called upon. A student selected for jury duty should inform his or her instructors and/or activity advisers. They will provide a reasonable substitute or compensatory opportunities for any required work missed. Absence will not be penalized in any way.

Class Schedule

All classes start promptly according to the class schedule shown. Students take classes grouped in sequences, as shown in the following chart. Most of the classes at Northeastern are scheduled in the time periods listed during the fall, winter, and spring quarters.

Students may leave fifteen minutes past the scheduled opening of class if the instructor is not present. Students are expected to be punctual. Students who are late for classes should attend for the balance of the period. Instructors will not tolerate habitual tardiness.

**Fall, Winter, and Spring
Schedule**

Business Students	Sequence 1	MWTh	8:00–9:05
	Sequence 2	MWTh	9:15–10:20
	Sequence 3	MWTh	10:30–11:35
	Sequence 4	MTTh	1:35–2:40
	Sequence 5	MTTh	2:50–3:55
	Sequence 6	MTTh	4:05–5:10
	Sequence 7	TF	8:00–9:05
		W	1:35–2:40
	Sequence 8	TF	9:15–10:20
		W	2:50–3:55
	Sequence 9	TF	10:30–11:35
		W	4:05–5:10
	Sequence 10	TWF	11:45–12:50
	Sequence A	MW	8:00–9:40
	Sequence B	W	1:45–3:25
		F	8:00–9:40
	Sequence C	MW	9:55–11:35
	Sequence D	TF	11:45–1:25
	Sequence E	TTh	1:45–3:25
	Sequence F	W	3:30–5:10
Summer Schedule		F	9:55–11:35
	Sequence G	TTh	3:30–5:10
	Sequence H	M	3:30–5:10
		F	1:45–3:25
	Sequence I	M	1:45–3:25
		W	11:45–1:25
	Sequence J	TTh	9:55–11:35
	Sequence K	TTh	8:00–9:40
	Sequence 1	MWTh	8:00–9:05
	Sequence 2	MWTh	9:15–10:20
	Sequence 3	MWTh	10:30–11:35
	Sequence 4	MTh	11:45–12:50
		W	1:00–2:05
Business Students	Sequence 5	MTh	1:00–2:05
		W	2:15–3:20
	Sequence 6	MTh	2:15–3:20
		W	3:30–4:35
	Sequence A	MW	8:00–9:40
	Sequence B	MW	9:55–11:35
	Sequence C	TTh	8:00–9:40
	Sequence D	TTh	9:55–11:35
	Sequence F	M	1:45–3:25
		W	2:15–3:55
	Sequence G	TTh	11:45–1:25
	Sequence H	TTh	1:45–3:25
	Sequence I	TTh	3:30–5:10

Activities hours. Undergraduate activities hours are Monday and Thursday, 11:45 AM–1:35 PM during fall, winter, and spring quarters. Summer activities hours are Wednesday, 11:45 AM–12:50 PM. No classes or other academic functions are held during these hours. Violations of this regulation should be reported to the Office of the Dean of Students or to the Office of Student Government.

Grades are officially recorded by letters, evaluated as follows.

Grading System

Grades	Numerical equivalent	Status
A	4.000	Outstanding achievement
A-	3.667	
B+	3.333	
B	3.000	Good achievement
B-	2.667	
C+	2.333	
C	2.000	Satisfactory achievement
C-	1.667	

D+	1.333	
D	1.000	Poor achievement
D-	.667	
F	.000	
I		Incomplete in a letter-graded course
S		Satisfactory achievement in pass/fail course; counts toward degree requirements
U		Unsatisfactory achievement in pass/fail course
W		Course withdrawal
X		Incomplete in a pass/fail course

An I or X grade shows that the student has not completed the course requirements. An average grade of D or less is not acceptable and will not allow a student to continue at Northeastern University.

Individual faculty may choose not to use plus or minus designations. If faculty elect to use only whole letters, they must announce this to the class at the beginning of the quarter.

Quality-point average. Numerical equivalents for scholastic averages are weighted according to the number of hours the course carries. For example, a grade of A in a course carrying 3 quarter hours is weighted at 12. A grade of C in a course carrying 2 quarter hours is weighted at 4. The quality-point average for both courses would then be 12 plus 4, divided by 5, or 3.2. Grades of X, I, S, and U are not included in the calculation of the quality-point average.

Credit hours. Credit hours are assigned to a course based on the established educational standard that one credit hour is equal to approximately three hours of student learning time per week over a period of a quarter, semester, or term (usually one hour of lecture or discussion, plus two hours of individual study outside class). When much individual study is involved, as in directed study or certain graduate courses, each additional hour of credit should represent at least three hours of student work.

Transfer of credits. With the approval of the academic dean or, for freshmen, the Office of Freshman Affairs, a student in one of the full-time day programs may take courses in University College, the School of Engineering Technology, graduate school, or the part-time engineering program and have those courses and grades recorded on the permanent record. Degree credit may be granted for transfer work from other institutions; students should check with the Office of Freshman Affairs or the dean of their college.

Pass/fail system. The individual schools and colleges state how and when the pass/fail system may be used. An outline of the general system follows.

- Any student not on academic probation may, beginning in quarter four, register for one pass/fail course per quarter if permission is granted by the college in which the student is enrolled and if the course is offered on a pass/fail basis. Freshmen and upperclass students may take one-quarter-hour courses in physical education on a pass/fail basis in any quarter. Enrollment in these courses does not prevent upperclass students from electing an additional four-quarter-hour course on a pass/fail basis.
- Pass/fail courses are normally restricted to electives outside the major field. The college faculty, however, may choose to adopt the pass/fail system of grading when it appears pedagogically sound for required courses within a program.
- Individual faculty members may decide whether any of their courses may be taken on the pass/fail system of grading, except when uniformity is necessary. In such cases, the department and/or college faculty offering the course determine whether the pass/fail system is used.
- Grades recorded on the basis of the pass/fail system do not figure in the computation of the quality-point average. Satisfactory completion of all courses taken on the pass/fail system is designated on the student's permanent record by the letter S. Unsatisfactory work is designated by the letter U. Any unsatisfactory grade must be handled according to the existing policy of the college but must never be cleared through the election of the same course pass-fail, except when this system is the only one used by the college for grading the course.
- An incomplete in a course taken on a pass/fail basis is designated by the letter X on the permanent record and treated according to the normal procedure for incomplete grades.
- To use the pass/fail system students must meet all prerequisites for the course. They have until the end of the second week of the quarter to declare their intention to receive a pass/fail grade. This deadline may be extended to the end of the eighth week at the option of the instructor.

Freshman reports. At the end of the first six weeks of each quarter, instructors are asked to interview those freshmen who are failing or near failing. Based on the data submitted by those instructors,

the Office of Freshman Affairs generates status reports and sends them to students and their faculty advisers. Final grades are mailed to students after each quarter.

Quarterly status reports. Grades are mailed to students approximately three days after each quarter. A missing grade ("*" on grade report) means that none was turned in by the instructor. Take up the matter of a missing or erroneous grade directly with the instructor.

Dean's list. A dean's list, or honors list, is issued at the end of each quarter containing the names of students who have a 3.25 quality-point average or higher with no I grade or grade below C-. Students who are on any form of probation, who are enrolled in a course on a pass/fail basis (except where there is no alternative or where required by the program), or who are not carrying a full load as determined by their undergraduate college are not eligible. With a few exceptions as approved by the respective colleges, a full load is considered to be four courses or sixteen quarter hours.

Alternative-year freshmen are eligible for the dean's list when they become sophomores in one of the full-time day programs.

Senior grades and status reports. During the spring quarter of senior year, each senior receives a transcript of his or her record to date. This transcript is a direct reproduction of the permanent record and is therefore cumulative. Students should understand that the permanent record is a working document, reflecting changes and additions as they occur. Carefully review transcripts and contact the registrar in 116 Hayden Hall with any problems or questions.

No grades are changed during June without the signatures of both the dean of the college and the instructor. Without the dean's cosignature, the grade change is implemented following commencement.

Transfer credits are applied toward graduation in June only if arranged with the college before the start of the spring quarter. Otherwise, the transfer credit is applied following commencement.

Procedure for clearing an I or changing other grades. Students may clear incomplete, failed, or dropped courses from official records. Freshmen should consult the Office of Freshman Affairs. Upperclass students should contact the office of the dean of the appropriate college as well as an adviser.

An incomplete (I) grade may be reported by the instructor when a student has failed to complete a basic component of a required course, such as homework, a quiz or final examination, a term paper, or a laboratory project. Students can make up an I grade by satisfying the requirements of the instructor or, if the instructor is absent, the chair of the department. Be aware that instructors' policies on the granting of incomplete grades may vary, and that the final decision on an incomplete grade is up to the instructor. The period for clearing an I grade and for changing a grade other than an I or failure (F or U) is restricted to one calendar year from the date it is first recorded on the student's permanent record. There is no charge for this change.

Freshmen with multiple course deficiencies, including incomplete (I) grades, do not have a calendar year's time to rectify the deficiencies.

Students who make up an I grade by taking a different course or repeating the same course will be given a new grade and billed accordingly.

To clear an I grade, a student must obtain a triplicate form on which the precise agreement for clearing an incomplete (I or X) grade is specified and which is signed by the student and the instructor. Forms are available in the department office. The student must make an appointment with the instructor to arrange for clearing the I grade. He or she must then complete the form, sign the agreement, and obtain the instructor's signature; leave a copy with the instructor, take one copy to the dean's office, and retain a copy as a personal receipt.

Any exception to this policy on change of grades must be recommended by the Academic Standing Committee of the college in which the course was offered and must be forwarded in writing by the dean to the registrar for implementation. (This process must be completed within one calendar year from the end of the quarter in which the course was offered.)

Commencing with grades given in the fall quarter of 1979, the University policy has been that I grades outstanding for twelve or more months cannot be changed.

Make up of deficiencies or failures. Failure in a course may be made up in another institution or at Northeastern's University College or School of Engineering Technology. Students who wish to make up coursework should consult the dean's office for specific information about the college's transfer credit policy.

Freshmen should become familiar with the specific standards for their college and should work with the Office of Freshman Affairs, 203 Ell Building.

Remedial/compensatory courses. Remedial/compensatory courses are currently offered for credit through different programs and colleges. While credit for remedial courses may be given, not all colleges or departments will apply these credits to major, distribution, or graduation requirements. Students should consult their advisers for specific information.

Examinations

Final examinations are held during the last week of each quarter. An examination schedule is posted at midterm on the registrar's official bulletin board. No examinations longer than one-half hour may be given in the week before final examinations. It is the student's responsibility to know the time and location of each of his or her examinations. Final exam conflicts, defined as two exams at the same hour or three exams in one day, will be resolved with the help of the scheduling office, 120 Hayden Hall, but only if reported before the last full week of classes.

A list of rules of conduct during examinations follows.

- Students must concentrate on their own work.
- Under no circumstances may a student communicate in any way with another student during an examination.
- Each student must work in a manner that does not bother other students.
- No unauthorized material is allowed in the examination room.
- Unless otherwise specified by the instructor and so understood by the head proctor, students who bring such materials as books, notebooks, and papers into a final-examination room must leave them either at the front or rear of the room or against the walls, at the option of the head proctor.
- All written material must be kept on the right arm of the chair. (In rooms with tables, materials are to be kept in front of students.)
- Proctors cannot answer questions about the examination material; students should ask questions that concern only possible typographical errors in the text or missing parts of the examination.
- No student may leave the room during the first thirty minutes of the examination. Late students may not enter the examination room if any other student taking the examination has already departed. Late students do not get extra time.
- Material may not be borrowed during the examinations.
- Students may leave the examination room permanently after thirty minutes have elapsed, but during the last ten minutes of the examination no one will be allowed to leave the room. Students remaining until the end of the examination must cease work immediately when the head proctor announces the close of the examination and must remain quietly seated until all examination materials have been collected.
- Students who become ill during an examination and are unable to complete the examination must report to the Lane Health Center immediately.
- Students must turn in all examination materials before leaving the room unless the instructor indicates that copies may be retained.
- With permission of the instructor, students may submit a stamped, self-addressed post card with the final examinations in order to receive grades early.

Academic Requirements

Depending on their college affiliation, freshmen must attain a final cumulative quality-point average of at least 1.4 or 1.6 (as noted in the individual college sections). They must also earn sufficient credits in order to progress into the sophomore year.

Drop back/repeating freshman status. Freshmen who fall below the 1.4/1.6 quality-point average standard and/or who have accumulated a quarter's worth or more of deficient credit (grades of F, W, I, U, X, or a missing course) are not permitted to progress with the original graduating class. Therefore, if the number of credits earned after the third quarter of the freshman year falls below the totals listed below, students may have their status changed to "repeating/continuing freshmen."

Credits that determine repeat status after third quarter	Total credits for freshman curriculum
31 or under	46
31 or under	47
32 or under	48
32 or under	49
33 or under	50
34 or under	51
34 or under	52
35 or under	53
36 or under	54
37 or under	55
37 or under	56

Students remain in repeating/continuing freshman status until quality-point average and credit requirements, as well as other college and/or major department standards for the freshman year, are satisfactorily completed.

University policy grants repeating freshman status on a quarter-by-quarter basis; the Office of Freshman Affairs reserves the right to withdraw a student for not making good academic progress. Two exceptions to this policy are the College of Business Administration and Bouvé College of Pharmacy and Health Sciences, which do not grant such status at all except under extenuating circumstances. Repeating freshmen in the College of Arts and Sciences must earn a 2.0 quality-point average each quarter; repeating freshmen in the Alternative Freshman-Year Program must pass all four classes with at least a 1.4 cumulative average in their first repeated quarter. No more than three academic quarters beyond the earlier three quarters of the original freshman year are allowed for repeating freshmen.

Academic probation with eligibility for cooperative work placement. This status exists in all colleges for freshmen who complete their programs with a quality-point average of 2.0 or higher and who have more than five deficient credits but less than a full quarter's worth of deficient credits. However, students in the College of Arts and Sciences who have less than a 2.0 quality-point average after the freshman year are on academic probation even if they earn all the credits associated with their particular major.

Academic probation without eligibility for cooperative work placement. Sophomores in all colleges are assigned this status if their freshman quality-point averages range from either 1.40 or 1.60 through 1.99 and if they have six through thirteen deficient credits. They remain on academic probation as sophomores in Division N until all sophomore and freshman make-up courses have been completed satisfactorily.

Academic eligibility for participating in student organizations. All students must have a minimum 2.0 overall grade point average in order to be eligible for an elected or appointed leadership position in any student organization.

Repeating classes to clear deficiencies. Students may, with approval, repeat a course or take a substitute course in the full-time day program to clear a deficiency. The final grade for this course replaces the former grade. Students who are repeating courses outside the full-time day program to raise their quality-point average or to clear a deficiency must attain an average of 2.0 in all repeated work.

Graduation Requirements

To be eligible to receive degrees, graduating students must clear all academic, financial, cooperative work, or disciplinary deficiencies. See individual programs for specific academic requirements for graduation.

Attendance at commencement is optional. Information concerning commencement is mailed to all graduating students during the spring quarter for June graduation or summer quarter for September graduation.

Seniors are notified by mail if they fail to qualify for their degrees. No special notice is sent to those who do qualify. Students who are in doubt should call their dean's office. The University has a residency requirement of a minimum of three full-time quarters at Northeastern immediately preceding graduation.

Graduation with honor is reserved for students who have attended a minimum of six full-time quarters and who have achieved quality-point averages as follows.

Quality-point average	Honor conferred
3.25–3.49	Graduation with honor (<i>cum laude</i>)
3.50–3.74	Graduation with high honor (<i>magna cum laude</i>)
3.75–4.00	Graduation with highest honor (<i>summa cum laude</i>)

Registration Procedures

Course prerequisites. Students are expected to meet prerequisites as listed in the course description of each course in which they enroll. Grades of F, U, I, X, or W in prerequisite courses do not normally fulfill requirements. Exceptions must be authorized by the academic department offering the course and be approved by the office of the dean of the student's college.

Declaring majors and minors. Undergraduate students generally declare their majors upon admission to the University or in the spring quarter of their freshman year. Majors are described under the various schools and colleges. Students may earn a minor in any undergraduate discipline that designates a minor. Students should declare their intent to earn a minor as early as possible, and no later than the end of the junior year, by applying to the minor department. During the final

term, the department offering the minor ensures that it appears on the student's academic record shortly after graduation by informing the registrar of the completion of the minor.

Internal and external transfer students. To transfer to another college within Northeastern University or to change majors within the same college, students should contact the appropriate office for their academic level. Upperclass students should consult the office of the dean of the college to which they want to transfer. Freshmen should consult the Office of Freshman Affairs, 203 Ell Building. Freshmen, as well as upperclassmen, seeking to transfer to nursing should apply directly to the College of Nursing, 211 Robinson Hall. A transfer to another college is not automatic but is based on a number of factors, including academic achievement and availability of space.

External transfer students are those who previously attended a college other than full-time day college at Northeastern. At the time of their admission, external transfers are identified as either freshmen with advanced standing or upperclass transfer students. Freshmen with advanced standing are those accepted with less than the equivalent of thirty-six quarter hours of transfer credit. They are included in the freshman class in quarter one, two, or three.

Upperclass transfer students have been accepted into a full-time day college with enough transfer credit to enable them to enter as sophomores, middlers, or juniors. Programs for upperclass transfers are generally planned with advisers in the offices of the department and dean.

Special students. Students not regularly enrolled in a full-time day college may, in certain instances, enroll on a quarter-by-quarter basis in some courses given in those colleges. Approval and further information must be obtained from the dean of the college offering the specific course.

Overload (additional course) policies. Upperclass students taking a full course load may take an additional enrichment course without charge. No credit is given for this course. Students wanting to take an additional course should confer with the dean or his or her designee to establish eligibility. The additional course must be a four-quarter-hour full-time day college course; the only such tuition-free course during the upperclass academic year; in addition to the normal course load for the quarter; and on a space-available basis on registration day, with priority given to tuition-paying students. The course does not contribute to fulfilling degree requirements or to the calculation of the quality-point average or total earned hours. After students have filled out and signed the necessary form, they must take the appropriate copy to the Office of the Registrar no later than the second week of the quarter.

Should students later petition to have credits earned in this course apply to their degree, they must obtain the approval of the dean or his or her designee, pay tuition at the rate current at the time of petition, and complete the process by May of their senior year.

Any student who registers for more quarter hours in a quarter than an existing curriculum allows is liable for the extra charges.

Students may withdraw from a course up to the eighth week. They can receive a refund or credit on a prorated basis if they drop a course between the first and fourth weeks of the quarter. However, no rebate or credit is granted when they voluntarily drop a course beyond the fourth week. Students who enroll in overload courses to clear failures or other deficiencies (W or I) are billed at the overload rate, one-sixteenth the tuition for that quarter, per quarter hour.

Dropping courses. To drop a course, students must first obtain a course drop form at the registrar's or college dean's office. Not attending a class does not constitute withdrawal. Students must fill out the course drop form and have it signed by their instructor and by a representative of either their college dean (for upperclassmen) or of the Office of Freshman Affairs (for freshmen). After obtaining all required signatures, students must return the original copy to the Office of the Registrar and keep a copy for themselves.

Course withdrawals are permitted through the third week of the quarter without any grade recorded on the permanent record. Course withdrawals at any time during the fourth through the eighth week of the quarter are indicated by a W on the record. After the eighth week, no withdrawals are accepted for any reason. At this point, a letter grade is posted on the record. A faculty member may choose not to sign a course withdrawal form if the student was involved in any kind of academic dishonesty in the class.

Change of name. Report all name changes to the Office of the Registrar immediately. This is especially important when students marry and wish to use a new name on University records.

Change of address. Notify the Office of the Registrar promptly of any address change. Both the permanent home address and the local address are needed.

Transcripts. To obtain an official transcript, students (and alumni/ae) must send a check in the amount stipulated by the Office of the Bursar, mailing instructions, and a disclosure waiver, if necessary, to the assistant University registrar at 117 Hayden Hall. To request a transcript in person, first obtain an official receipt from the Office of the Cashier at 248 Richards Hall; then present the receipt and a valid photo ID at 117 Hayden Hall. Telephone requests are not accepted. You can obtain unofficial transcripts in person only by presenting a valid photo ID at 117 Hayden Hall.

Withdrawal from the University. Students seeking to withdraw from the University for any reason should begin the process at the appropriate office for their academic level. Upperclass students should contact the office or the dean of their college. Freshmen should go to the Office of Freshman Affairs, 203 Ell Building. Students wishing to transfer should consult the dean's office for their school or the Office of the Dean of Students, 203 Ell Building.

Students may be withdrawn from the University for financial, disciplinary, academic, or health reasons. In the last case, a committee will review the recommendations of the director of health services to determine whether the student should withdraw. The student has an opportunity to present his or her case to the committee. Withdrawals are made only when it is determined that the student is a danger to himself or herself or to other members of the University community, or when the student has demonstrated behavior detrimental to the educational mission of the University.

Procedures for student leave of absence for medical reasons. After the eighth week of the quarter students may withdraw from course work (leave of absence) only for medical reasons. A student taking a leave of absence from academic work for medical reasons must contact the dean's office of his or her college. Medical reasons are considered to include both physical and emotional well-being. A representative of the dean's office will discuss the situation with the student and refer the student to the Lane Health Center with a petition form. The petition for a medical leave of absence must be made prior to the end of the quarter. The student's physician must provide appropriate medical information to the Lane Health Center physician. A student who is on co-op when he or she needs a medical leave of absence must contact the co-op coordinator.

A medical leave of absence may be effective for up to six months. During this period the student maintains all the rights and responsibilities of a Northeastern University student. If the student is covered under the Northeastern-sponsored Blue Cross/Blue Shield insurance, it remains in effect. After six months the student must obtain re-entry or be withdrawn from the University.

When the student is ready to return to the University, he or she must again contact the appropriate college representative, who in turn refers the student to the Lane Health Center. The center must be provided with medical documentation validating the treatment and the student's fitness to return to school. Strict confidentiality is maintained in all aspects of medical leaves of absence. Exceptions to these procedures are handled by the appropriate academic standing committee.

College Expenses

All students registered in a full-time day college are charged full tuition for coursework of twelve quarter hours or more. In addition, charges are made for coursework beyond the normal academic schedule. Students should note that the freshman year consists of three quarters of full time study. The co-op program does not begin until sophomore year.

A number of payment plans and financial aid and scholarship programs are available to help students meet college expenses. For information, contact the Office of Financial Aid, 356 Richards Hall, 617-373-3190.

Tuition is paid in installments at the beginning of each quarter. Tuition for freshmen is computed by the year and paid in three equal installments or on the schedule provided for in one of several payment plans available at Northeastern. Freshman payment deadlines are August 16, 1993; December 13, 1993; and March 21, 1994. Deadlines for January enrollees are December 13, 1993; March 21, 1994; and June 13, 1994.

Payment deadlines for upperclass students are by division. Division A: December 13, 1993, and June 13, 1994; Division B: September 13, 1993, and March 21, 1994; Division C (those who are temporarily or permanently on a noncooperative plan year): September 13, 1993; December 13, 1993; and March 21, 1994.

The following chart estimates the annual costs for most students. Costs vary with the year and program of study. Tuition rates, room and board charges, and fees are subject to revision by the Board of Trustees at any time. In addition to the costs listed below, students should estimate costs for supplies, personal expenses, and transportation. If a student defaults on tuition and/or residence payments, he or she shall be liable not only for the outstanding balance, but also for reasonable collection costs and attorneys' fees incurred by the University in collecting unpaid balances.

1993-1994 Tuition

College/school/program	Freshmen (3 quarters)	Upperclass students (2 quarters)
Business	\$12,585	\$11,820
Computer Science	\$12,585	\$11,820
Engineering	\$12,585	\$11,820
Engineering Technology	\$12,585	\$11,820
Arts and Sciences	\$12,585	\$10,680
Criminal Justice	\$12,585	\$10,680
Journalism	\$12,585	\$10,680
Nursing	\$12,585	\$10,680
Pharmacy and Health Sciences	\$12,585	\$10,680
Alternative Freshman-Year	\$12,585	
Physical Therapy	\$12,585	\$11,160

The following fees are required of all students.

Application fee. This nonrefundable \$30 fee must accompany an application for admission.

Tuition deposit. A nonrefundable tuition deposit of \$100 applied to the first quarter tuition account is due by May 1 from all students entering in September. Students entering at other times of the year should note the required deposit date on their certificates of acceptance.

Student services fee. Students pay a \$50 yearly student center fee to support the Ell Student Center and a \$12 student activities fee to support student clubs.

Photo-identification card. This \$2 card is issued to new full-time students at orientation and registration. Students must have a properly validated card to use most University facilities. A replacement card costs \$5.

University health insurance. The University provides hospital insurance and a student health program for all students who have matriculated, carry a course load of nine credits or more, or are enrolled in a full-time program. This program is mandated by the Commonwealth of Massachusetts.

Students who are covered under a comparable hospital insurance plan may waive the University-offered insurance program by filing a waiver available at the Bursar's Office.

Sports pass fee. This \$45 fee (\$25 if student begins classes in winter quarter) allows students to attend all regular home games without additional charges.

Other fees may include the following.

Housing deposit. New students seeking on-campus housing must submit a nonrefundable \$400 deposit along with a completed housing application form to complete the housing application process. The upperclass housing deposit is \$75 per quarter.

Residence hall activities fee. All students living in the residence hall system pay a quarterly \$15 fee for activities sponsored by the Residence Student Association and the hall governments.

Deferred tuition payment fee. Northeastern University offers a three-payment option available prior to the first week of classes. Information regarding this plan, which is administered by the Tuition Plan of New Hampshire, may be obtained by calling 1-800-343-0911. There is a nominal fee for participation in this program.

Late payment fee. Failure to make payments in accordance with the prescribed regulations results in a \$200 fee.

International student fee. The one-time fee of \$200 is charged to new undergraduate international students, payable after their acceptance at Northeastern.

Laboratory deposits. Students taking laboratory courses purchase laboratory deposit cards from the Office of the Cashier as directed by the department offering the course. These deposits cover any breakage of laboratory apparatus.

Liability insurance. Students in most health profession programs, such as nursing, pharmacy, and respiratory therapy, are required to pay a liability insurance fee of \$18.

Room and Board

At the beginning of the first quarter, all entering freshmen living in University residence halls will be billed for the nineteen meals per week option (\$1,110). Once on campus, freshmen may select either a ten or fifteen meal plan option.

Returning upperclass students must apply for housing each quarter.

Traditional Residence Halls

	Single	Double	Triple
Kerr Hall	\$1,450	\$1,210	
Light Hall	\$1,450	\$1,210	\$1,150
Melvin Hall	\$1,450	\$1,210	\$1,150
Smith Hall	\$1,450	\$1,210	\$1,150
Speare Hall	\$1,450	\$1,210	
Stetson West	\$1,450	\$1,210	
Stetson East	\$1,450	\$1,210	
Northeastern At The Y	\$1,250		
<i>Suites</i>			
Kennedy Hall	\$1,450	\$1,210	
153 Hemenway	\$1,450	\$1,210	\$1,150

Apartments

	Single	Double	5-Bedroom*	6-Bedroom*	8-Bedroom*
157-163 Hemenway	\$1,550	\$1,475	\$1,425	\$1,390	\$1,310

*\$150 extra for a single room within an apartment.

	Single	Double	Triple	Quad
Burstein	\$1,775	\$1,400	\$1,250	\$1,050
Rubenstein	\$1,775	\$1,400	\$1,250	\$1,050
St. Stephens St.	\$1,825	\$1,450	\$1,300	\$1,150
407 Huntington	\$1,825			\$1,300
337 Huntington	\$1,825	\$1,450		
319 Huntington	\$1,825	\$1,450	\$1,300	\$1,150
Willis Hall		\$1,750		\$1,475

University Dining Service

All students who live in traditional University residence halls and suites are required to participate in the food plan run by University Dining Service.

Meals per week	Cost per quarter
19	\$1,110
15	\$1,005
10	\$910
5	\$440 upperclass only

University-Wide Programs

Honors Program

The University invites qualified students in each of its colleges to participate in a comprehensive honors program designed to foster high intellectual development and achievements. Based on criteria established by an individual college for its own majors, students are invited into the program as entering freshmen or as entering sophomores (based on Northeastern freshman-year grades). Other students may be recommended or express interest on their own at later points in their undergraduate careers.

Special limited-enrollment sections of many first- and second-year courses are offered for honors students. Honors seminars on interdisciplinary subjects are open to honors students. Junior/senior honors projects or courses are required of students in the program.

Honors and standard sections of courses are usually equivalent in terms of satisfying degree requirements and are distinguished by course number. For example, the honors section of ECN 1115 is ECN 1715; for PHL 1100 it is PHL 1700. An updated list of offerings is available in the honors program office and also appears in the registrar's course listings.

There are two other types of honors courses. *Honors within a standard course* are activity courses that allow students to substitute special work for some of the standard assignments within the course. *Honors outside a standard course* are adjunct courses that carry an additional one quarter-hour credit so that students receive two grades: one in the standard course and one in the honors adjunct. This one quarter-hour course may be taken only with another standard course and represents the enriched work that makes the entire five quarter-hour honors course. Activity and adjunct courses only appear on the listing in the honors program office. Because they do not carry separate numbers, activity and adjunct courses do not appear as honors-level in the registrar's course listings. Honors courses may be taken as a free overload. Criteria for free overloads are available in the honors program office.

The honors program also sponsors extracurricular cultural and recreational activities. Students may choose special honors housing in 115–119 Hemenway Street and/or use the honors lounge, study room, and computer room in 1 Nightingale Hall.

For more information on honors courses, on how to qualify to take courses, and on other aspects of the program, contact the honors program at 617-373-2333 or drop by 1 Nightingale Hall.

Honors Scholarships

Ambassador Awards. The University offers five half-tuition scholarships for exceptional academic achievement to non-U.S. citizens for the freshman year (September through June). The Ambassador Awards are given to freshmen enrolled in a full-time day academic program and are not renewable.

Carl S. Ell Presidential Scholarship Program. This program was established to recognize some of the University's finest incoming students and to foster the continuation of their superior academic performance.

Each year a limited number of freshmen who have records from high school that exhibit exceptional promise are selected for this academic achievement award. Criteria for selection include high school records indicating a college preparatory program, class rank, grade-point average, extracurricular activities, community service, letters of recommendation from guidance counselors, and SAT or ACT test scores.

The Ell Scholars effective with the Class of 1998 are awarded full tuition scholarships for their freshman year. Those who continue to maintain a superior scholastic average will have their scholarships renewed at the full tuition level in subsequent years. The Class of 1998 also receives full room, board, and fees plus stipend for one international cooperative education internship.

Students in the classes of 1994–1997 who have maintained a superior scholastic average will also receive full tuition scholarships, but they do not receive the room, board, fees or international cooperative education internship stipend.

In addition to the awarding of financial assistance, the scholars are provided with a number of opportunities to engage in intellectual exchange on campus.

The application deadline is March 1. Carl S. Ell recipients must follow procedures to receive state and/or federal education grants to which they may be entitled.

Dr. Ralph J. Bunche Scholars Program. Northeastern honors the late Dr. Ralph J. Bunche, Nobel laureate and former undersecretary of the United Nations, by awarding ten scholarships annually to African-American students who have outstanding records of academic achievement and leadership. The Bunche awards guidelines and characteristics are the same as those established through the Carl S. Ell program.

Compensatory Courses

Compensatory courses in English and mathematics are for freshman native speakers of English whose reading, writing, and/or mathematical skills need strengthening.

The University uses one or more of three criteria to determine which freshmen participate in the compensatory programs: pre-college academic credentials, tests administered during orientation week, or performance in ENG 1110, Freshman English 1.

In general, the program consists of five courses, each offering four hours of credit. The courses must fit into the following sequences.

Fall*

MTH 1000	Mathematical Preliminaries 1
ENG 1110	Freshman English 1†
or	
ENG 1013	Fundamentals of English 1

Winter*

MTH 1010	Mathematical Preliminaries 2
ENG 1014	Fundamentals of English 2

Special notes. Successful completion of Mathematical Preliminaries 1 and 2 is a prerequisite for: MTH 1101, MTH 1106, MTH 1107, and MTH 1108

MTH 1113 and MTH 1114

Nonbusiness mathematics sequence

Business mathematics sequence

A passing letter grade in Freshman English 1 or Intensive Writing is a prerequisite for:

ENG 1111	Freshman English 2
ENG 1111-ENG 1113	Engineering sequence
ENG 1111	Engineering technology

*The same sequence is offered winter/spring for students who enter in January.

†Students whose work in this course is unacceptable for success in ENG 1111, Freshman English 2, will receive a grade of S and must complete ENG 1014, Fundamentals of English 2.

Schedule for Continuation of Compensatory Programming

Acceptance for credit is determined by the faculties of the individual colleges and is therefore subject to change. The chart below outlines policies on compensatory courses. Asterisked (*) courses are graded pass/fail and therefore are not included in the student's quality-point average. A yes designates acceptance for credit, a no non-acceptance, and an n/a, not applicable.

	English 1 (ENG 1110/1013)	English 2 (ENG 1014)	Mathematical Preliminaries 1* (MTH 1000)	Mathematical Preliminaries 2* (MTH 1010)
Arts and Sciences	yes	yes	yes	yes
Business Administration	yes	yes	yes	yes
Computer Science†	yes	yes	n/a	n/a
Criminal Justice	yes	yes	yes††	yes††
Engineering†	n/a	n/a	n/a	n/a
Engineering Technology	yes	yes	n/a	n/a
Nursing	yes	yes	no	no
Pharmacy and Health Sciences	yes §	yes	no	no

†This college offers MTH 1120 and MTH 1121, a course sequence in college calculus with algebra and trigonometry, to students who test deficient in mathematics. The sequence involves extra work in algebra and trigonometry and covers the same material as the regular freshman calculus sequences.

††Students whose diagnostic examinations suggest a need for basic mathematics may elect MTH 1000 or MTH 1010 to prepare for MTH 1106, Fundamentals of Mathematics.

§This college will accept ENG 1110 or ENG 1014 for credit only with a letter grade. Students who complete English courses must still take a four-credit English elective.

ROTC, Military Officers' Education Program

The Department of Military Science offers the Reserve Officers' Training Corps (ROTC) program. The goal of ROTC is to develop men and women with leadership potential and prepare them for an officer's commission in the military service of the United States. The curriculum teaches principles of personnel management and seeks to develop leadership traits such as teamwork, ready acceptance of responsibility, the desire to achieve, self-confidence, and discipline.

The Army ROTC program is conducted at Northeastern. The Air Force and Navy ROTC programs are conducted at Boston University. For more information, write or call the Department of Military Science, 430 Parker Building, Northeastern University, Boston, MA 02115, 617-437-2372.

Marion M. Ferguson, Lt. Col., U.S. Army, MS, *Professor and Chair,*
Department of Military Science

Assistant Professors

Warren K. Dixon, Maj., MA

Kerry M. Granfield, Capt., BA

Dominic D. Swayne, Capt., BS

Completion of the program can lead to an officer's commission in the United States Army, Army National Guard, or United States Army Reserve.

The program consists of the basic course (freshman and sophomore years) and the advanced course (middler, junior and senior years). It does not conflict with co-op schedules.

Enrollment in the basic course is voluntary and is open to all full-time students who are United States citizens. Students in the basic course do not incur a military obligation.

The advanced course is open to all qualified students who meet these prerequisites: completion of the basic course (or approved equivalent), or prior honorable military service; physical aptitude and medical requirements; and age requirements. Advanced course students receive a \$100-per-month stipend, up to \$1,000 per year. They are also paid for the six-week advanced camp they normally attend between their junior and senior years. Uniforms are issued to cadets without cost except for a refundable uniform deposit.

Full-time students meeting specific requirements may apply for scholarships covering their last four, three, or two academic years. These are merit-based scholarships, and a student's earnings during cooperative work periods do not reduce scholarship payments. The Army ROTC scholarship pays 80 percent of the student's tuition and provides an allowance for textbooks and laboratory fees, plus an additional living allowance of \$100 per month, up to \$1,000 for each year the scholarship is in effect.

Transfer students, whether or not previously enrolled in ROTC, are welcomed to join the program. They should contact the Department of Military Science concerning their options for program enrollment. Honorably discharged veterans (enlisted) are a vital part of our cadet corps and will receive special consideration for ROTC enrollment.

James L. Frey, Lt. Col., U.S. Air Force, MPA, *Professor and Chair,*
Department of Aerospace Studies, Boston University

The Air Force Reserve Officers' Training Corps (AFROTC) program offers students an opportunity to earn a commission in the United States Air Force. The student is commissioned as a second lieutenant upon completion of both the aerospace studies (AS) curriculum and the requirements for an undergraduate or graduate degree. AFROTC classes and leadership laboratories are conducted on the Boston University campus. For more information, write the Department of Aerospace Studies, Boston University, 118 Bay State Road, Boston, MA 02215-1796, or call 617-353-4705.

The AFROTC program offers a four-year and a two-year program. Undergraduates may join the four-year AFROTC program by registering for the appropriate aerospace studies classes. Students from all academic disciplines, including five-year co-op, may register. Preferred entry is the first quarter of the first year, although students may enter as late as November of the sophomore year.

Academic coursework focuses on the functions and organizations of the Air Force, military history with an emphasis on the use of airpower, management techniques, and international relations and the impact policies have on the defense establishment. In addition, weekly leadership laboratories introduce students to Air Force customs and leadership skills. The Air Force uniform and AFROTC books are provided to the student free of charge except for a refundable uniform deposit.

Participation in AFROTC by nonscholarship students during the first two years of the four-year program carries no commitment to serve in the Air Force. The nonflying commissioned graduate incurs a four-year active duty service commitment. Navigators incur a six-year post-training commitment, and pilots incur a ten-year post-training commitment.

For entry into the two-year program students must have at least six remaining academic quarters of undergraduate or graduate study, meet Air Force physical standards, be of good moral character,

Army

Air Force

and successfully complete a six-week field training encampment during the summer before the start of the junior year. Prospective two-year program members should contact the University AFROTC detachment no later than December of the sophomore year.

Two scholarship programs are available. High school seniors may apply for the College Scholarship Program before December 1 of their senior year through their academic advisers or a local Air Force recruiter. The Scholarship Actions Program is available to freshmen and sophomore students. Students who attend AFROTC classes in the fall quarter of their freshman year are eligible for two- or three-year scholarships; others are eligible for two-year scholarships.

Navy

Michael E. Field, Capt., U.S. Navy, MA, *Professor and Chair,*
Department of Naval Science, Boston University

The Naval Reserve Officers' Training Corps (NROTC) Nurse program provides an opportunity for a commission as a naval officer in the Nurse Corps. Nursing students at Northeastern may enroll in the NROTC Nurse program with the Department of Naval Science at Boston University.

Anyone wishing to contact NROTC should write to or call the office of the Commanding Officer, NROTC Unit, Boston University, 116 Bay State Road, Boston, MA 02215-1796, 617-353-4232/2535.

NROTC has two basic programs: the scholarship program and the college program. The scholarship program provides full tuition, uniforms, books and fees, and a \$100 per month stipend for four or two years of instruction at Northeastern University. These scholarships are granted as a result of annual nationwide competition. The college program provides students with naval science texts, uniforms, and a \$100 per month stipend during the last two academic years. Scholarships may be awarded to selected applicants who have been active in the college program for at least one semester. Applications for the college program are made through the Department of Naval Science at Boston University.

A two-year program is available for sophomores or middlers who do not join NROTC by the start of their sophomore year. Both scholarship and college program options are available; selection for this program takes place in the spring, and all applications must be submitted by late February of the sophomore year.

To be eligible for the Naval ROTC program, students must meet citizenship, age, and physical fitness requirements and be enrolled in a program leading to a nursing baccalaureate degree.

The NROTC program requires completion of both the academic major, including three quarters of English composition, and the naval science curriculum; participation in leadership laboratories (two hours a week during the school year); and indoctrination tours conducted at Navy/Marine Corps facilities.

The NROTC Nurse program also requires some professional training, depending on the program and the time of entry. This training occurs during summer "cruises" of four to six weeks each for scholarship students, and one "cruise" of four to six weeks for college program students.

Upon graduation and completion of NROTC requirements, scholarship students are obligated to serve on active duty for four years, college-program students for three years.

Academic Programs and Curriculum Guide

About Sample Curricula

Each department description includes a sample of the curriculum a student might follow to meet degree requirements. These sample curricula are for general information. Course requirements, elective course distribution, and achievement levels vary from program to program, and even class to class. Consult with your academic advising office, listed below, to make certain you have all the necessary resources before planning your own curriculum.

Alternative Freshman-Year Program	249 Ryder
College of Arts and Sciences	400 Meserve
African-American Studies	132 Nightingale
American Sign Language–	
English Interpreting	276 Holmes
Anthropology/Sociology	501 Holmes
Art and Architecture	239 Ryder
Biology	414 Mugar
Chemistry	102 Hurtig
Communication Studies	147 Meserve
Economics	301 Lake
Education	54 Lake
English	406 Holmes
Geology	14 Holmes
History	249 Meserve
Human Services	210 Lake
Journalism	102 Lake
Linguistics	565 Holmes
Mathematics	567 Lake
Modern Languages	360 Holmes
Music	351 Ryder
Philosophy and Religion	103 Meserve
Physics	111 Dana
Political Science	303 Meserve
Psychology	125 Nightingale
Theatre	337 Ryder
Bouvé College of Pharmacy and Health Sciences	206 Mugar
College of Business Administration	250 Dodge
College of Computer Science	161 Cullinane
College of Criminal Justice	400 Churchill
College of Engineering	220 Snell
College of Nursing	102 Robinson
School of Engineering Technology	120 Snell

Special note. In assessing quarter weights for courses, one quarter-hour of credit is equal to 50 minutes of instruction per week, plus two hours of preparation.

The Scheduling Office, 126 Hayden Hall, maintains all quarter-hour weights for courses. In the event of error in any publication, the academic record will reflect the correct quarter-hours applicable to any degree requirement.

Some course titles change, while the course number remains the same. Students must be sure not to register for a course they have already taken.

Middler-Year Writing Requirement

All middlers (that is, students who have earned 80+ quarter hours including non co-op students) must complete this graduation requirement at Northeastern. The requirement should preferably be completed before students accrue 144 quarter hours. Successful completion of Freshman English is a prerequisite to the MYWR. Students fulfill the Middler-Year Writing Requirement in one of two ways, depending on the requirements of their college: 1) complete a four quarter-hour MYWR course with a grade of C (2.0) or better; or 2) pass a one quarter-hour Writing Workshop (pass/fail). No transferred course from another university may satisfy this requirement.

This University requirement is designed to help students improve their writing for major courses and in their workplaces. The eight courses are therefore interdisciplinary so that students may write in subjects related to their major. For additional information, students may contact the English department, 406 Holmes Hall, 617-373-2512.

Intermediate Writing	ENG 1350
Writing for the Professions: Business Administration	ENG 1381
Writing for the Professions: Criminal Justice	ENG 1382
Technical Writing	ENG 1125
Writing Workshop specified for major	ENG 1340

Writing for the Professions: Health Services	ENG 1380
Advanced Writing	ENG 1352
Topics in Writing	ENG 1360
Technical Writing 2	ENG 1370

Colleges have specific guidelines and schedules for options that apply to majors. Students should consult their dean's office or adviser for guidelines. The following colleges recommend these MYWR courses.

College of Arts and Sciences	ENG 1350
Bouvé College of Pharmacy and Health Sciences (PAH)	ENG 1350 or ENG 1340
College of Business Administration	ENG 1381
College of Computer Science	ENG 1125
College of Criminal Justice	ENG 1382
College of Engineering (ENG'G)	ENG 1125 or ENG 1340
School of Engineering Technology (ENG'G)	ENG 1340
College of Nursing	ENG 1380

Undergraduate Degrees

College of Arts and Sciences

Majors	Bachelor of Arts		
Concentrations	Bachelor of Science		
Minors	Bachelor of Science in Education		
	African-American Studies	Environmental Geology	Philosophy
	Cultural Studies	<i>Environmental Geology</i>	<i>Philosophy</i>
	Historical Studies	Geology	Physics
	Social/Behavioral Studies	<i>Geology</i>	<i>Physics</i>
	<i>African-American Studies</i>		
	American Sign Language– English Interpreting¹	History	Political Science
		<i>History</i>	Law and Legal Issues
	Anthropology	Human Services²	Public Administration
	<i>Anthropology</i>	<i>Human Services</i>	<i>Political Science</i>
	Applied Physics¹	Independent Studies	Psychology
			<i>Psychology</i>
	Art	Journalism	Sociology
	Architecture	Advertising	<i>Sociology</i>
	Graphic Design	Newspaper/Print	
	<i>Art</i>	Public Relations	Theatre
		Radio/Television News	Theatre Generalist
	Biochemistry¹	Linguistics	Production
		<i>Linguistics</i>	Performance
	Biology		<i>Theatre</i>
		Mathematics	
	Chemistry	<i>Mathematics</i>	Interdisciplinary Minors
	<i>Chemistry</i>		<i>Asian Studies</i>
	Communication Studies	Modern Languages	<i>Cinema Studies</i>
	Speech and Rhetoric	French	<i>Latino, Latin American, and Caribbean Studies</i>
	Organizational	German	<i>Marine Studies</i>
	Communication	Italian	<i>Media Studies</i>
	Radio and Television	Russian	<i>Technical Communication</i>
	<i>Communication Studies</i>	Spanish	<i>Urban Studies</i>
		<i>French</i>	<i>Women's Studies</i>
	Economics	<i>German</i>	
	<i>Economics</i>	<i>Italian</i>	
	Education	<i>Russian</i>	
	Early Childhood Education	<i>Spanish</i>	
	Elementary Education		
	<i>Education</i>	Music	
		Music Industry	
	English	Music Literature	
	<i>English</i>	Music Literature and Performance	
		<i>Music</i>	
		<i>Music Industry</i>	

¹ Bachelor of Science only² Bachelor of Arts and Bachelor of Science in Education offered

**Bouvé College of
Pharmacy and
Health Sciences**

Associate in Science
Bachelor of Science

Majors <i>Minors</i>	Athletic Training Cardiopulmonary Science Cardiovascular Health and Exercise	Health Information Administration	Medical Laboratory Science <i>Medical Laboratory Science</i>
Additional Degrees	Associate in Science in Dental Hygiene Bachelor of Science in Dental Hygiene	Bachelor of Science in Pharmacy Bachelor of Science in Physical Therapy	Bachelor of Science in Respiratory Therapy Bachelor of Science in Toxicology

**College of Business
Administration**

Bachelor of Science in Business Administration
Bachelor of Science in International Business

Concentrations	Accounting Entrepreneurship and New Venture Management Finance and Insurance	Human Resources International Business Administration Logistics and Transportation	Management Management Information Systems Marketing
<i>Minor</i>	<i>Business Administration</i>		

**College of Computer
Science**

Bachelor of Science
Bachelor of Arts

College of Criminal Justice	Bachelor of Science
Concentrations	Criminology and Corrections Legal Studies Policing and Security

College of Engineering	Bachelor of Science Bachelor of Science in Chemical Engineering Bachelor of Science in Civil Engineering Bachelor of Science in Electrical Engineering
Majors	Electrical Engineering Computer Engineering Power Systems
Additional Degrees	Bachelor of Science in Industrial Engineering Bachelor of Science in Mechanical Engineering Bachelor of Science/Master of Science in Electrical Engineering Bachelor of Science/Master of Science in Industrial Engineering Bachelor of Science/Master of Science in Mechanical Engineering
Concentration	Computer Engineering

College of Nursing	Bachelor of Science in Nursing
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**School of Engineering
Technology**
**Bachelor of Science in Engineering
Technology**
Majors

**Aerospace Maintenance
Engineering Technology**

Computer Technology

**Electrical Engineering
Technology**

**Mechanical Engineering
Technology**

**Boston-Bouvé College of
Human Development
Professions¹**

Bachelor of Science

Bachelor of Science in Education

**Bachelor of Science in Recreation
and Leisure Studies**

Majors

**Physical Education/
Teachers Preparation**

**School and Community
Health Education**

¹ Boston-Bouvé College of Human Development Professions degrees will be discontinued after June 30, 1997.

College of Arts and Sciences

Robert P. Lowndes, PhD, *Dean*

Timothy Donovan, PhD *Associate Dean, External Affairs*

Kay D. Onan, PhD, *Associate Dean, Faculty Affairs*

James R. Stellar, PhD, *Associate Dean, Undergraduate Affairs*

Mary Mello, MA, *Director, Academic Administrative Services*

Marva Perry, MA, *Assistant Dean, Minority Affairs*

Charles J. Haberle, MS, *Assistant Director, Undergraduate Student Services*

Gail F. Leclerc, MEd, *Academic Adviser*

Joseph O. B. Monahan, MA, *Coordinator, International Study Programs and Academic Adviser*

A broad study of disciplines in the arts and sciences is the core of higher education. Most students in the University—no matter what career training they choose—devote a substantial portion of their studies to the arts and sciences.

The college as a whole emphasizes general education through the college core curriculum. In addition, a large number of interdisciplinary and extradisciplinary programs are available. These include national and international exchange programs for study and experience; programs in field settings at sea and abroad; and programs involving affiliations in such areas as professional performing arts organizations, media organizations, and government offices.

In most programs, students may choose a four-year, full-time track or the five-year co-op plan. The five-year plan offers opportunities for paid employment, often in an area related to the student's chosen academic area. Students are normally eligible to participate in co-op when they become sophomores.

Students may enter the college with a specified major or with an unspecified liberal arts major preference (LAMP). Students in the LAMP program, however, must declare a major by the end of the freshman year. Considerable flexibility exists, and many students change majors during the first two years. The college offers a Bachelor of Arts degree and a Bachelor of Science degree in most programs, as well as a Bachelor of Science in Education dual major in several programs. In general, the Bachelor of Arts degree requires more college core curriculum courses as well as a foreign language. The Bachelor of Science and Bachelor of Science in Education degrees requires fewer core curriculum courses but more work in the specific majors.

Many programs are flexible enough to allow students to pursue a double major. To do so, students must complete requirements for both majors.

The college also offers the option of an independent major for students whose interests and goals are not met by a specific major program. Interested students should consult an adviser in the dean's office after their sophomore year.

Class Entrance Requirements

In order to make normal progress, students in the College of Arts and Sciences are expected to maintain a minimum cumulative quality-point average of 2.0 and to earn 16 quarter hours of credit each quarter. For further details, refer to the *College of Arts and Sciences Guidebook* available from the dean's office, 400 Meserve Hall.

Graduation Requirements

Quantitative. Candidates for either the Bachelor of Arts or Bachelor of Science degree must successfully complete 176 quarter hours. In addition, only 4 quarter hours of physical education and no ROTC credits may be used to meet this requirement.

Residency. Candidates must complete either 75 percent of the degree credit (132 quarter hours) or the last three full quarters (a minimum of 12 four-credit courses) in the Northeastern University Basic Day Colleges.

Qualitative. Candidates must achieve a minimum cumulative average of 2.0 (grade of C).

Transfer credit. Transfer credit is granted initially for courses that fulfill major, college, or elective requirements in an arts and sciences program. Courses must be from an accredited college or university and credit will be granted only for courses in which the student earned a grade of at least C (2.0). Courses taken pass/fail are not eligible for transfer credit. To receive credit for courses in progress at the time of application, the student must submit an updated official transcript for review. Students should contact a major or dean's office adviser prior to enrollment to have transfer credits evaluated, both for major and college requirements. Students who believe that they should be granted additional transfer credit should consult with an academic adviser in the College of Arts and Sciences dean's office, 400 Meserve Hall.

Core curriculum. The College of Arts and Sciences core curriculum is required of all students. The core curriculum is a set of requirements intended to provide students with the opportunity to gain the broad base of knowledge traditionally associated with a liberal arts education. The core allows students to develop proficiency in basic skills; to be exposed to methods of inquiry in the various subjects and disciplines in the arts and humanities, the social sciences, and the natural sciences and mathematics; and to become acquainted with ideas in Western culture, differing views in non-Western cultures, and major issues and problems facing contemporary society.

The core curriculum consists of six categories:

Category I Basic Skills

- Freshman English (two or three courses)
- College mathematics
- Modern language through Intermediate 2 level (required of all Bachelor of Arts candidates)

Category II Methods of Inquiry

Category III The Western Cultural Heritage

Category IV Alternative Cultures and Societies

Category V Theoretical Perspectives and Changes

Category VI Current Issues in Perspective

For placement information on freshman English, college mathematics, or modern languages, students should consult the Office of the Dean, 400 Meserve Hall, or the appropriate department. Placement criteria are published in *The College of Arts and Sciences Guidebook*.

Descriptions for all College of Arts and Sciences courses begin on page 104. Courses approved for the college's core curriculum have Roman numerals in parentheses at the end of the descriptions to indicate the appropriate core curriculum categories for each core course. Students are required to complete courses in each category of the core, depending on the major and degree pursued. The *College of Arts and Sciences Guidebook*, available in the Office of the Dean, 400 Meserve Hall, provides a list of courses that may be used to fulfill each category requirement.

Foreign language. All Bachelor of Arts degree candidates must show proficiency in a modern foreign language by earning a passing grade in Intermediate 2 level of a college course or by meeting a comparable criterion approved by the Department of Modern Languages.

Conditional exemption from this requirement may be granted to students who earned an average of C or better in a full, four-year language sequence in secondary school. A conditional exemption must be confirmed by taking a proficiency examination during the first quarter at the University. A sufficiently high score will verify the exemption; otherwise, the student will be advised of the appropriate language course to take in the following quarter.

Absolute exemption is granted to students for whom English is a foreign language or who receive a score of 550 or better in the Language Achievement Examinations.

The normal sequence for students with no prior preparation is two quarters of elementary-level language and two quarters of intermediate-level language. The Department of Modern Languages will determine an appropriate entry point at which students who have partial language preparation may begin completing the requirement. Students who plan to use German, Russian or Italian to fulfill the foreign language requirement should begin study as early as possible; the college is not able to offer these courses on a regular basis.

Middler-year writing requirement. The middler-year writing requirement (MYWR) may not be fulfilled until the student has successfully completed at least 80 quarter hours (including transfer credit) and should preferably be completed before 144 quarter hours. The requirement must be fulfilled at Northeastern. The College of Arts and Sciences strongly recommends intermediate writing (ENG 1350) to complete the MYWR. Students may, however, also satisfy the requirement by completing a four-credit writing course from the approved MYWR list (found in the *College of Arts and Sciences Guidebook*) with a grade of C or better or, with special permission, a one-credit writing workshop (ENG 1340). Students not participating in the cooperative education program complete the MYWR in their junior year.

Interdisciplinary Minors

Minor in Asian Studies Curriculum

Students may choose a concentration in Middle Eastern studies or East Asian studies (China, Japan, Korea). Courses cover a range of academic disciplines including anthropology, history, music, philosophy and religion, sociology, language, and political science. In each concentration, three core courses and four electives are required.

Concentration in Middle Eastern studies. HST 1612, The Modern Middle East; PHL 1280, Islam; and POL 1345, Government and Politics in the Middle East. Choose four electives: ECN 1332,

Economic History of Less Developed Countries; HST 1613, Contemporary Middle East; HST 1614, The Middle East Today in Fact, Fiction, and Film; HST 1652, Islam Resurgent; MUS 1182, Music of the Middle East; and POL 1384, Arab-Israeli Conflict.

Concentration in East Asian studies. HST 1637, Modern Japan; PHL 1275, Eastern Religions; and POL 1371, Government and Politics of China. Choose four electives: HST 1150, Introduction to Third World History; HST 1633, Modern China; HST 1634, Contemporary China; POL 1332, Government and Politics of Japan; HST 1641, Recent Leaders of Asia; PHL 1130, Ethics: East and West; PHL 1255, Indian Philosophy; PHL 1250, Chinese Philosophy; PHL 1293, Mysticism: East and West; POL 1372, China's Foreign Relations; and SOC 1104, Contemporary Japanese Culture and Society.

For both concentrations, it is strongly recommended that students gain proficiency in an Asian language. Chinese courses are currently taught in the program.

Minor in Cinema Studies Curriculum

The minor in cinema studies helps students acquire skill in analyzing one of the major art forms and cultural influences of the twentieth century. It also provides critical tools that can be used to study the relationships between film and society, history, aesthetics, performance, philosophy, and psychoanalysis. Students take eight courses: two required courses, a filmmaking requirement, and five electives. The interdisciplinary curriculum draws from courses in several departments.

LNF 1550, Introductory Film Analysis; LNF 1551, Film Theory; and one of the following: ART 1171, Animation Workshop; ART 1180, Video Basics; or CMN 1450, Television Studio Production. Choose five electives: ART 1233, Contemporary Directions in Cinema; ART 1235, History of Film; ART 1236, The American Film; ART 1238, Documentary Film; ART 1281, Video Project; ENG 1288, Film and Text; ENG 1289, Shakespeare on Film; ENG 1290, Topics in Film (may not be counted more than twice); ENG 1291, Popular Culture; ENG 1294, Modern Film; ENG 1295, American Film and Society; ENG 1297, Approaches to Film; HST 1494, History and Film; HST 1575, History of Media in America; HST 1591, American Images of China; INT 1320, Exploring the Humanities through Film; INT 1321, Modernism; LNF 1521, French Film Masterpieces; LNF 1560, Film and Psychoanalysis; LNG 1554, Modern German Film and Literature; LNS 1550, Spanish Civil War in Spanish Film; MUS 1139, Film Music; SOA 1120, Camera on Culture: Visual Anthropology; CMN 1454, Programming for Radio and Television; CMN 1455, Television Field Production; CMN 1554, Special Topics in Media (when appropriate); THE 1316, Acting for the Camera; THE 1849, Special Topics.

For more information, contact the director of cinema studies, Professor Inez Hedges (1 Boston YMCA), at 617-373-5163.

Minor in Latino, Latin American, and Caribbean Studies

This minor offers students an interdisciplinary curriculum drawn from seven academic departments. The Latin American and Caribbean studies emphasis combines historical, social-scientific, ecological, and cultural-aesthetic approaches to the study of Central American, South American, and Caribbean society. Latino studies explores the large, long-standing, and growing Latin American presence in communities outside Latin America, especially in North America. The minor helps students prepare for more specialized work in fields such as business, social services, diplomacy, health, law, education, and international relations with Latin American and Latino populations both in the United States and abroad.

The minor includes a strong link to the co-op program, to community-based internships, and to study abroad programs. It is strongly recommended that students pursuing the minor achieve proficiency in Spanish. Students take six required courses and either complete an internship or co-op experience in a community-based agency or participate in a study abroad program. All students must take INT 1121, Introduction to Latino, Latin American and Caribbean Studies; one course in history; one course in language, literature, and music; one course in social science; and two comparative courses that include Latin American, Caribbean, or U.S. Latino populations. Students should consult with the academic adviser for the minor to make final determination of courses included.

Humanities, language, and literature: LNS 1315, Latin American Literature (Colonial, 19th Century); LNS 1316, Latin American Literature (20th Century); LNS 1500, Backgrounds in Hispanic Culture; LNS 1501, Backgrounds in Latin American Culture; LNS 1511, Introduction to Caribbean Literature; MUS 1184, Music of Latin America and the Caribbean; and new courses added in this area.

Social science: POL 1368, Government and Politics of Latin America; SOA 1430, Latin American Society and Development; SOC 1460, Sociology of Latino Society; and new courses added in this area.

Comparative Studies (courses that include components of Latino, Latin American and Caribbean societies and compare them to other societies): AFR 1151, African-American Art History; AFR 1155, Foundations of Black Culture; AFR 1294, Third World Political Relations; MUS 1180, Introduction to World Music; POL 1316, Contemporary Revolutionary Politics; POL 1386, International Law; SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOA 1146, Rural Workers in the Third World; SOC 1146, Environment and Society; SOC 1170, Race and Ethnic Relations; SOC 1171, Race and Ethnic Relations: A World Perspective; SOC 1255, Sport in Society; SOC 1455, Sport and Culture; THE 1847, Images of Afro-American and Latina Women in Film; and new courses added in this area.

Minor in Marine Studies Curriculum

The marine studies minor allows students from all majors to explore the marine environment. Students may focus on either the scientific or social science/humanistic approach to studying the ocean. The program is designed to develop specific marine-related skills and requires completion of an independent study. Students are encouraged to participate in marine field courses such as Northeastern's East-West Program, which focuses on biological research, or the SeaSemester Program, which includes sail-training on a tall ship.

For more information contact Professor Peter Rosen, marine studies coordinator, 617-373-3176.

Minor in Media Studies Curriculum

To qualify for a minor in media studies, the student must complete a minimum of eight courses: CMN 1250, Introduction to Mass Communication; HST 1575, History of Media in America; and CMN 1300, Communication Theory or CMN 1317, The Audience in Mass Communication or INT 1320, Exploring Humanities through Film; and five elective courses from the two categories media production and media application (at least two electives in each category). Individual student programs may be developed. Students should contact Professor Alan Zarembo (Department of Communication Studies) for information on program development and elective choices.

Minor in Technical Communication Curriculum

Technical communication combines written, oral, and graphics skills with a background in science or technology. The minor in technical communication prepares students for careers as technical writers, or for careers in which technical communication is a significant part of the job. Students in English or other liberal arts studies may elect the minor, as may students from a variety of technological or scientific fields. A student does not have to be enrolled in the College of Arts and Sciences to declare the minor.

Eight courses are required: ENG 1125, Technical Writing; ENG 1370, Technical Writing 2 or ENG 1371, Writing for the Computer Industry; ENG 1352, Advanced Writing or ENG 1380, Writing for the Professions: Health Services or ENG 1381, Writing for the Professions: Business Administration; CMN 1116, Public Speaking or CMN 1331, Advanced Interpersonal Communication; JRN 1440, Design and Graphics (or an equivalent in another department or college); COM 1101 Algorithms and Data Structures 1; and two of the following, preferably both within the same discipline: BIO 1106, General Biology; BIO 1107, Animal Biology; CHM 1111, General Chemistry 1; CHM 1112, General Chemistry 2; GE 1106, Programming Computers; GEO 1212, Physical Geology; GEO 1222, Historical Geology; IIS 1125, COBOL Programming 1; PHY 1221, Physics for Science and Engineering Students 1; PHY 1222, Physics for Science and Engineering Students 2; PHY 1223, Physics for Science and Engineering Students 3.

Minor in Urban Studies Curriculum

Students must take seven courses. SOC 1147, Cities and Society; POL 1324, Urban Politics; ECN 1320, Urban Economics; and one course from each of the following areas:

Urban problems and policies: SOC 1346, Suburb and Metropolis; POL 1308, Politics of Poverty; POL 1318, State and Local Government; ECN 1321, Urban Economic Problems and Policies.

Urban humanities: HST 1391, European Urban History to 1850; HST 1543, American Urban History; ENG 1608, The City in Literature.

Urban form and design: ART 1111, Introduction to Architecture; ART 1225, Modern Architecture 1; ART 1150, Architectural Design 1.

African-American studies : AFR 1261, Economics of Urban Poverty; AFR 1275, Urban Political Issues; AFR 1475, Public Policy Analysis.

To obtain credit for the minor, students must file a petition form with the College of Arts and Sciences. Interested students should confer with an adviser as soon as possible. Advisers are Professor Robert Gilbert, political science, 303 Meserve Hall, 617-373-2796; Professor Peter Serenyi, art and architecture, 239 Ryder Hall, 617-373-2347; Professor Gregory Wassall, economics, 317 Lake Hall, 617-373-2196.

Minor in Women's Studies Curriculum

Women's Studies is an interdisciplinary program that incorporates scholarship on women's and men's roles in society and examines the importance of gender in past and present societies. Students examine traditional stereotypes and changing roles; learn about women in history, literature, culture, and politics; and consider the changing situation of men and women today. The Women's Studies Program coordinates the Boston Area Colloquium on Feminist Theory, organizes an in-house lecture series, produces the Working Papers in Gender Studies Series, and sponsors the International Research Associates in Women's Studies for visiting scholars. The program also maintains liaisons with the student-run Women's Center at Northeastern.

Students take a total of seven courses: HST 1490 or INT 1150, Introduction to Women's Studies; SOC 1302 or INT 1302, Feminist Perspectives on Society; and five electives.

Undergraduate elective courses. AFR 1241, Black Family; BIO 1187, Biology of Human Reproduction; CJ 1616, Women and the Criminal Justice System; CMN 1232, Female/Male Communication; ECN 1312, Women in the Labor Market; ENG 1551, Gender Roles in Literature; ENG 1600, Topics in Literature; ENG 1602, Major Figure; other literature courses when gender-oriented; HST 1472, The Family in European History; HST 1473, Women in Modern Europe; HST 1554, Women in America; HST 1644, Third World Women; LNF 1560, Film and Psychoanalysis; LNS 1510, Saints and Sinners; MUS 1106, Women in Music; MUS 1800, Directed Study; NUR 1303, Life Crisis: Analysis and Response; PHL 1295, Medicine, Religion, and the Healer's Art; POL 1327, Sex Roles in American Politics; POL 1328, Women in Public Management; PSY 1218, Psychology of Women; SOA 1160, Sex, Sex Roles, and the Family; SOA 1301, Human Origins; SOA 1303, Sexuality and Culture; SOC 1155, Sociology of the Family; SOC 1160, Sex-Gender Roles in a Changing Society; SOC 1177, Social Roles in the Business World; SOC 1178, Women Working; and SOC 1217, Women, Health, and Social Change; and SPC 1500, Communication and Gender.

Graduate elective courses. CJ 3513, Gender and Justice: Women, Crime, and the Law; ENG 3317, Topics in Criticism: Feminist Literary Theory; English: Topics in Literature courses accepted when focused on women; ENG 3403, Topics in Linguistics: Language, Gender, and Power; HST 3370, Seminar in History of the Family; HST 3399, Seminar in Approaches to Women's History; POL 3665, Women in Public Management; POL 3667, Equal Opportunity in Public Administration; POL 3668, Legal Issues in Public Personnel Administration; SOA 3102, Class and State Formation; SOA 3156, Gender, Kinship, and Social Change; SOC 3155, The Family; SOC 3160, Women, Men, and Social Change; SOC 3175, Sociology of Work; SOC 3302, Feminist Methodology; SOC 3304, Feminist Theory; and SOC 3410, Contemporary Issues in Sociology when gender oriented.

These are only some of the courses offered. New courses are continually being developed and added to the program. For more information and the most recent brochure describing the Women's Studies Program, contact Professor Debra Kaufman at 617-373-4442 or Ms. Audrey Aduama, 617-373-4984.

Special Programs

Additional information is available from involved departments and the Office of the Dean, 400 Meserve Hall.

The availability of all special programs is contingent on meeting minimum enrollment numbers and, when an outside institution is involved, continued affiliation of that institution with the University. Overseas study programs are open to qualified middlers, juniors, and seniors with a cumulative quality-point average of 3.0 or higher.

Independent Major

An eligible student may petition the College Curriculum Committee to meet requirements for a degree in an independent major. Eligibility, procedures, and requirements must be discussed in advance with an adviser in the Office of the Dean. No student may be considered for an independent major until a curriculum proposal has been submitted to, and approved by, the College Curriculum Committee.

Combined Program with Professional Schools

In the combined program, a preprofessional student may reduce by one year the time normally required for obtaining both the undergraduate and professional degrees. Students who have completed at least three-fourths of the work required for a baccalaureate degree in the College of Arts and Sciences and who are accepted into an approved professional school of dentistry, law, medicine, optometry, osteopathy, or veterinary medicine will be eligible for the Bachelor of Arts or Bachelor of Science degree at the end of their second year in a professional school. At least two-thirds of the work for the baccalaureate degree must be earned in residence at Northeastern, and all other College of Arts and Sciences requirements must be fulfilled. The residence requirement must be completed prior to entering the professional school.

**Bachelor of Arts or
Bachelor of Science/
Juris Doctor Degree
Program**

Northeastern offers an eight-year joint degree program for aspiring lawyers. Each year a limited number of highly qualified freshmen are admitted to the five-year undergraduate portion of the program.

To continue into the law school portion of the program, students must graduate in the top 15 percent of their class and score in the top 20 percent of the Law School Aptitude Test (LSAT). Students who meet these criteria will be qualified to continue their studies at Northeastern University School of Law.

**Bachelor of Arts or
Bachelor of Science/
Master of Business
Administration Program**

A limited number of students may combine an initial period of undergraduate study in the College of Arts and Sciences with graduate study in the College of Business Administration, enabling students to earn both the Bachelor of Arts or Bachelor of Science and the Master of Business Administration degrees in a five-year period.

In the first three years, students complete nine academic quarters of arts and sciences courses with two summers of cooperative education. After taking the GMAT examinations and being accepted into the College of Business Administration in the third year, students spend their fourth year taking additional courses in their major and beginning graduate coursework. After a quarter of business co-op, students spend the final year in graduate coursework in the College of Business Administration.

Students in this program earn both the undergraduate arts and sciences and graduate business degrees in the time typically required to complete, with full-time cooperative education, the undergraduate degree alone. Interested students should contact the College of Arts and Sciences dean's office or the College of Business Administration's graduate school in 205 Hayden Hall.

International Programs

Ireland: North and South. Through collaborative arrangements with the Institute of Public Administration in Dublin, Ireland, and the Queen's University of Belfast, Northern Ireland, qualified Northeastern students may attend classes during the fall in Dublin, where they also intern with members of the lower house of the Irish parliament (the Dail). Students then attend classes during the winter at the Queen's University of Belfast. A total of thirty-two credits may be earned for this program.

Northeastern University—Moscow State University Exchange. This program offers students with some knowledge of Russian the opportunity to take additional language courses, and to attend lectures in history, political science, and sociology. Students may participate for one or two quarters.

School for Field Studies. The College of Arts and Sciences is affiliated with the School for Field Studies (SFS), a nonprofit educational organization that offers semester-long field study expeditions throughout the world. Offered every year are such programs as wildlife management in Athi Plains, Kenya; coral reef ecology in St. John, U.S. Virgin Islands; and the rain forest biogeography of North Queensland, Australia. Programs combine applied academics with training in field research methods and teamwork. Credit is granted for the coursework. Additional information may be obtained from the dean's office.

European studies program. This two-quarter program, conducted at the University of Antwerp (Belgium) and the University of London (England), provides students with insights into the history, organization, and activities of the European community. The fall quarter at Antwerp includes an intensive language course in Dutch or French, although the program's other courses are conducted in English. Students may elect to go only to London, for one or two quarters.

Foreign Languages

Business German. Students may use this course as a prerequisite to conversational German courses to prepare for a business-oriented co-op in Germany. This course, taught in English, is designed for students of business and economics seeking competence in reading and understanding texts produced by the German business community and trade media. Additional information may be obtained from Professor Ross Hall in the Department of Modern Languages, 360 Holmes Hall, 617-373-2234.

Elementary Spanish for criminal justice or human services majors. This course is intended for students who will need to use Spanish in police work and in social service settings. The grammar component is the same as that in other elementary Spanish courses. The vocabulary is adapted to particular needs and interests of the students. Students use role-playing extensively and practice "intake" interviews.

French for business and economics students. Designed for students interested in international business, the program offers a thorough study of grammar, insights into the French way of life, specialized vocabulary related to the business world, and an introduction to French business texts. The course is a preliminary step for the student wishing co-op placement in France. Additional information may be obtained from Juliette Gilman, 362 Holmes Hall, 617-373-3659.

Marine Science

East/West Marine Biology Program. The East/West Marine Biology Program allows advanced undergraduate and beginning graduate students in biology and related areas to spend a year of field study in three diverse marine environments.

The program begins in the fall in Friday Harbor, Washington, on San Juan Island. In January, students travel to Jamaica to study tropical biology at the Discovery Bay Marine Laboratory on the island's north coast. The final phase of the program is conducted at Northeastern's Marine Science Center in Nahant, Massachusetts.

Marine Science Center Summer Program in Marine Biology. The summer program allows students to participate in intensive courses at the Marine Science Center (MSC). Students conduct independent research at the MSC laboratory throughout the year. Graduate students from other universities are encouraged to use the laboratory and field sites for thesis research.

Massachusetts Bay Marine Studies Consortium. Northeastern University is a member of the Massachusetts Bay Marine Studies Consortium. The consortium's offerings are interdisciplinary and seek to bridge academic disciplines and current concerns in the marine world. The consortium serves the students and faculty of twenty-two Boston-area colleges and universities. Students from Northeastern may take these classes, which are taught by specialists and government officials. For more information, contact Professor Peter S. Rosen, Department of Geology, 617-373-4380.

Performing and Visual Arts

The Division of Performing and Visual Arts is a unit within the College of Arts and Sciences that produces and presents a variety of professional arts programs, including the annual nuArts Performance series. In collaboration with the departments of art, music, and theatre, the division also sponsors and supports artist-in-residence programs and regularly scheduled lectures, demonstrations, and master classes.

In addition, the division includes the African-American Master Artists-in-Residency Program, a community-oriented, multicultural professional arts program located off-campus in Jamaica Plain.

The division also manages the University's performing arts facilities and operates the Northeastern University Arts Ticket Center, located in the lobby of the Ell Building. The ticket center is open noon to 6 pm weekdays.

For information on arts activities, please call the division office at 617-373-2249. For ticket information, call the ticket center at 617-373-2247.

African-American Studies

Ronald W. Bailey, PhD, *Professor and Chair*

Professor

Patrick Manning, PhD
History

Associate Professors

Abdul Alkalimat, PhD
Sociology
Jordan Gebre-Medhin, PhD
Anthropology
Maryemma Graham, PhD
Literature
Robert L. Hall, PhD
History
Leroy Johnson, PhD
African History
William Lowe, MA
Music
Joseph D. Warren, PhD
Social Welfare

Assistant Professors

Leonard Brown, PhD
Music
Robin Chandler, PhD
Sociology and Art
Elizabeth H. Freydberg, PhD
Theatre
Kwamina Panford, PhD
Law, Policy, and Society
Clark White, PhD
Sociology

Associated Faculty

Oscar Brookins, PhD
Economics
Donald M. Jacobs, PhD
History
William F. Miles, PhD
Political Science

The diverse experiences of black people—in the United States, Africa, the Caribbean, South America, and other parts of the world—are the focus of the major in African-American studies. The curriculum is interdisciplinary in approach and includes historical, social and behavioral, and cultural studies. International studies and contemporary public policy issues are also integral parts of the program. In class, in co-op, and in internships, students apply theoretical knowledge to real-world problems and concerns.

Students with training in African-American studies have the knowledge to meet the challenges posed by the diverse racial, cultural, and ethnic groups in the United States and abroad. Many graduates attend professional schools or teach at the secondary or the college level. Others work in museums, libraries, or research centers; in business; or in public service, social service, or law-enforcement agencies.

AFR 1100, Introduction to African-American Studies; AFR 1131, African-American History 1; AFR 1155, Foundations of Black Culture; one course on the Black experience outside the United States; and AFR 1355, Senior Seminar.

Five courses from one of three areas of concentration: historical, cultural, or social/behavioral studies. Courses offered in other departments may also satisfy this requirement with departmental approval.

Four courses which will allow students to explore additional topics and areas of interest.

In addition, complete the arts and sciences core curriculum (see page 31).

AFR 1100, Introduction to African-American Studies; AFR 1131, African-American History 1; AFR 1155, Foundations of Black Culture; AFR 1249, Black Community and Social Change; and AFR 1355, Senior Seminar. One course on the Black experience outside the United States. One additional elective selected by the student in consultation with a departmental adviser.

Bachelor of Arts and Bachelor of Science Curriculum

Minor Curriculum

American Sign Language–English Interpreting

Marina L. McIntire, PhD, *Associate Professor and Director*

Teaching Staff

Nancy V. Becker, MEd
Barrie Booth, MEd
Susan W. Hostovsky, BA
Holbrook C. Robinson, PhD
Alice Sykora, MEd

American Sign Language (ASL) is a complete language used by large numbers of people. By mastering ASL, students gain both access to the culture of deaf America and insights into features of spoken language that are often taken for granted. Learning a modally different language gives students a new sense of the power of language and an appreciation of how it shapes their world. In this way, the mastery of ASL sharpens critical-thinking skills.

The program provides a firm foundation in language, linguistics, culture, and interpreting, plus a broad-based liberal arts education. American Sign Language courses are integral to degrees in human services with a specialization in deaf studies and in linguistics with a focus on ASL.

Opportunities for ASL–English interpreters are increasing, due to recent federal legislation. Graduates work as interpreters in such areas as higher education, advanced technology, and theatre.

The ASL Interpreter Education Project seeks to enhance the skills of interpreters currently working in the field and to increase the supply of competent interpreters in New England.

Bachelor of Science Curriculum

ASL 1101, ASL 1102, American Sign Language 1 and 2; ASL 1201, ASL 1202 Intermediate American Sign Language 1 and 2; ASL 1211, Deaf Culture; ASL 1250, Linguistics of ASL; ASL 1301, ASL 1302, Advanced American Sign Language Proficiency 1 and 2; ASL 1500, Introduction to Interpreting; ASL 1505, ASL 1506, ASL 1507, ASL–English Interpreting 1, 2, and 3; ASL 1520, Interpreter Roles and Ethics; ASL 1521, Contrastive Analysis; ASL 1522, Discourse Analysis for Interpreters; ASL 1810, Special Topics in Interpreting; ASL 1820, Interpreting Practicum 1; ENG 1118, Introduction to Language and Linguistics; PSY 1110, Perspectives in Psychology 1; PSY 1112, Foundations of Psychology 2; SOA 1335, Language and Culture; SOC 1100, Introduction to Sociology; and CMN 1110, Voice and Articulation.

One course from the following: ENG 1402, Grammars of English; ENG 1407, Introduction to Semantics; ENG 1408, Topics in Linguistics; ENG 1690, Junior/Senior Seminar; LNL 1235, Applied Linguistics 1; LNL 1240, Bilingualism; PSY 1262, Psychology of Language.

One course from the following: PHL 1165, Moral Problems in Medicine; PSY 1271, Social Psychology; SOC 1102, Social Inequality and Communication; SOC 1135, Social Psychology; SOC 1140, Sociology of Prejudice; SOC 1310, Class, Power, and Social Change.

One course from the following: CRS 1200, Introduction to Special Education; ED 1302, The Human Services Professions; SOC 1240, Sociology of Human Service Organizations.

One course from the following: THE 1160, Movement 1; PSY 1263, Nonverbal Communication; CMN 1111, Oral Interpretation of Literature; CMN 1115, Foundations of Communication; CMN 1330, Interpersonal Communication 1.

In addition, complete the arts and sciences core curriculum (see page 31).

Art and Architecture

Peter Serenyi, PhD, *Professor and Chair*

Professor

Mardges Bacon, PhD

Associate Professors

Samuel S. Bishop, MFA

Mira Cantor, MFA

T. Neal Rantoul, MFA

Assistant Professors

Edwin C. Andrews, MFA

Mary Ann Frye, MFA

Dianne W. Pitman, PhD

Julie Curtis Reed, MFA

George Thrush, MArch

Lecturers

Cynthia Baron, BA

Lawrence Bluestone, MCPUD

Joanna Bowdenweber, MFA

Judith Brassard Brown, MFA

David A. Conant, MArch

Rick Eifler, MArch

Joseph Ferrara, MArch

Christopher D. Ferrier, MFA

David Florentin, BSC

Elizabeth Gibb, MArch

Patrick Hickox, MArch

David Judelson, MArch

William Loftis, MPhil

John Lueders-Booth, MEd

Uy Thanh Ly, MS

Joel Marcus, MFA

Michael McPherson, MFA

Scott Nash, MFA

James Noon, PhD

Barry B. O'Brien, MS

Thomas J. Petit, MFA

Joel Sadagursky, BS

Mark Schatz, MArch

Lisa Taft, BFA

Nader Tehrani, MAUD

Mary Ann Thompson, MArch

The visual arts are our oldest form of artistic expression. The ability to understand and use visual language is an increasingly important part of contemporary education.

The department aims to introduce art and architecture as both historical disciplines and creative activities; to offer a focused study of the visual arts, either through a critical examination of the language and the content of art and architecture within the context of a particular historical period, or through hands-on experience in a studio setting; and to offer a solid academic foundation for careers in architecture, graphic design, photography, and teaching the history and the practice of art.

Cooperative education placements for art majors include positions in architecture and design firms, museums, libraries, historical collections, and archives.

The city of Boston, with its superb architecture, museums, galleries, cinemas, and public library, is a primary resource for the department. Encouraging students to take advantage of these resources is a significant aim of the department. In addition, many of Boston's leading artists, architects, and designers teach our studio courses.

Bachelor of Arts and Bachelor of Science Curriculum

Major in art. ART 1100, History of Art to 1400, and ART 1101, History of Art since 1400; ART 1124, Basic Drawing; ART 1130, ART 1131, Visual Studies Foundation 1 and 2; and twelve art electives.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in architecture. Leading to a BS degree that is not a professional degree in architecture. The twelve art electives are replaced by four architectural history courses (ART 111, Introduction to Architecture; ART 1203, Medieval Architecture *or* ART 1204, Renaissance Architecture; ART 1225, Modern Architecture 1 *or* ART 1223, American Architecture; and ART 1226, Modern Architecture 2.

Eight architectural studio courses: ART 1156, Architectural Drafting; ART 1150, 1151, 1252, 1253, 1258, 1259, Architectural Design 1 to 6; and ART 1350, Architectural Thesis.

Two computer courses: ART 1190, Introduction to Computer Graphics and ART 1295, Computer Aided Design.

Three building technology courses: ART 1256, ART 1257, Theory of Structures 1 and 2; and ART 1355, Environmental Systems.

Four math/science courses: MTH 1123, MTH 1124, Calculus 1 and 2; PHY 1221, PHY 1222, Physics for Engineering Students 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in graphic design. Same requirements as for the art major, except that the twelve art electives are replaced by: ART 1132, Principles of Graphics; ART 1133, Graphic Design 1; ART 1134, Typography 1; ART 1144, Typography 2; ART 1160, Introduction to Photography; ART 1180, Video Basics; ART 1190, Introduction to Computer Graphics; ART 1213, Modern Art; ART 1230, History of Photography *or* ART 1237, Contemporary Directions in Cinema; ART 1240, History of Graphic Design; ART 1241, Advertising Design; ART 1243, Graphic Design 2; ART 1244, Graphic Design 3; ART 1250, Color Theory and Practice; ART 1254, Intermediate Drawing; ART 1263, Introduction to Color Photography; ART 1280, Media Graphics; ART 1290, Electronic Publishing Design; ART 1291, Intermediate Computer Graphics Workshop; and ART 1330, Advanced Visual Communication.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

General minor. Select any six courses from the departmental curriculum.

Minor in history of architecture. ART 1200, Ancient Architecture; ART 1203, Medieval Architecture; ART 1204, Renaissance Architecture; ART 1223, American Architecture; and ART 1225, ART 1226, Modern Architecture 1 and 2.

Minor in architecture. ART 1111, Introduction to Architecture; ART 1124, Basic Drawing *or* ART 1156, Architectural Drafting; ART 1226, Modern Architecture 2; ART 1150, Architectural Design 1; ART 1151, Architectural Design 2; and ART 1252, Architectural Design 3; *one of the following:* ART 1253, Architectural Design 4; *or* ART 1295, Computer Aided Design; *or* ART 1355, Environmental Systems.

Minor in studio art. ART 1124, Basic Drawing; ART 1127, Basic Painting; ART 1130, Visual Studies Foundation 1; ART 1132, Principles of Graphics; ART 1138, Introduction to Printmaking; and ART 1243, Graphic Design 2 *or* ART 1254, Intermediate Drawing.

Minor in graphic design. ART 1130, ART 1131, Visual Studies Foundation 1 and 2; ART 1132, Principles of Graphics; ART 1134, Typography; ART 1241, Advertising Design *or* ART 1133, Graphic Design 1; and ART 1250, Color Theory and Practice.

Minor in photography. ART 1160, Introduction to Photography; ART 1261, Intermediate Black and White Photography; ART 1230, History of Photography; ART 1233, Contemporary Directions in Photography; ART 1263, Introduction to Color Photography; and ART 1363, Advanced Photography Seminar.

Biochemistry

Biochemistry includes nearly the entire spectrum of science—from physics and chemistry to biology and health care. The biochemistry major, sponsored jointly by the departments of biology and chemistry, provides a strong foundation in mathematics and the physical sciences.

Biochemists are working to decipher the information stored in human chromosomes. What they learn will be used to pinpoint the genetic causes of many diseases. The biochemistry major helps students prepare to work in research on such diseases as AIDS, cancer, and Alzheimer's; in genetic engineering; or in environmental clean-up.

A Bachelor of Science degree in biochemistry allows students to enter the job market directly or go on to graduate, medical, veterinary, dental, law, or business school. Students may find positions in biotechnology companies, drug companies, or government agencies, working in laboratory or clinical research, quality control, production, information systems, marketing, or technical sales. Students may also pursue graduate study in biochemistry, molecular biology, cell biology, biophysics, genetics, toxicology, biotechnology, clinical chemistry, animal science, nutrition, plant pathology, or other biomedical sciences..

Bachelor of Science Curriculum

BIO 1103, BIO 1104, BIO 1105, Principles of Biology 1, 2, and 3; BIO 1260, Genetics and Developmental Biology; BIO 1461, General Biochemistry 1; BIO 1462, General Biochemistry Lab; BIO 1463, General Biochemistry 3; BIO 1467, Molecular Biology; and BIO 1480, Senior Biochemistry Seminar.

CHM 1111, CHM 1112, General Chemistry for Life Sciences 1 and 2 *or* CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1153, The Chemical Elements; CHM 1221, Analytical Chemistry; CHM 1271, CHM 1272, CHM 1273, Organic Chemistry for Chemistry Majors 1, 2, and 3; and CHM 1280, CHM 1281, Physical Chemistry 1 and 2.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; PHY 1201, PHY 1202, PHY 1203, Physics for the Life Sciences 1, 2, and 3 *or* PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; two quarters of corresponding physics lab courses; six advanced biology and chemistry electives (minimum of two from each discipline); and demonstrated computer literacy.

In addition, complete the arts and sciences core curriculum (see page 31).

Biology

David C. Wharton, PhD, *Professor and Chair*

Professors

Gwilym S. Jones, PhD
Charles A. M. Meszoely, PhD
M. Patricia Morse, PhD
Fred A. Rosenberg, PhD
Ernest Ruber, PhD
Phyllis R. Strauss, PhD
Carol M. Warner, PhD

Associate Professors

Joseph L. Ayers, PhD
Kostia Bergman, PhD
Donald P. Cheney, PhD
H. William Detrich, PhD
Charles H. Ellis, Jr., PhD
Aileen F. Knowles, PhD
Helen H. Lambert, PhD
Richard L. Marsh, PhD
Jacqueline M. Piret, PhD
Susan Powers-Lee, PhD
Daniel C. Scheirer, PhD
Wendy A. Smith, PhD
Jon D. Witman, PhD

Assistant Professors

Frederick C. Davis, PhD
Maryellen Polvino-Bodnar, PhD

Professors Emeriti

Francis D. Crisley, PhD
Charles Gainor, PhD
Nathan W. Riser, PhD

Adjunct Professor

Bruce B. Collette, PhD

By majoring in biology, students develop a basic understanding of the organization and the processes of life, from molecules and cells through organs and organ systems to populations, species, ecosystems, and evolution. The major offers the mathematical, chemical, and physical background necessary for understanding biology and the practical scientific skills associated with each of these areas. It allows students to begin to specialize in a subdiscipline of biology.

Students who decide to major in biology in the freshman or sophomore year may follow the prescribed academic sequence; students who enter the major in the middler year may complete the major in the normal time by taking some electives concurrently with the biology core, or Biocore, courses. After completing the Biocore, students interested in independent research may arrange to undertake a more extensive honors program involving up to four quarters of research.

To graduate with a major in biology, a student must have a cumulative quality-point average (QPA) of 2.0 for all science and mathematics courses required for the major. The Bachelor of Arts and Bachelor of Science degrees require a modern language. The Bachelor of Science program is more extensive in its mathematics and science requirements and may offer better preparation for some areas of postgraduate study. The department publishes *The Biology Undergraduate Advisory Book*, which explains the required and recommended courses and the QPA standards for biology majors. The advisory book is available in the Department of Biology, 414 Mugar Hall.

The undergraduate biology major prepares students for careers in the life sciences, including medical, dental, and other health-related fields. Students may find employment in federal, state, industrial, hospital, or university laboratories or in industries involved in the manufacture and distribution of pharmaceuticals, biological products, food, or scientific equipment. Biologists also work in fisheries, forestry services, county and state agencies, museums, aquariums, research vessels, and marine stations.

Graduate study culminating in a master's or doctoral degree can lead to careers in upper-level teaching or research in zoology, botany, microbiology, physiology, ecology, marine biology, cell biology, molecular biology, or biochemistry. Biology majors may also pursue postgraduate training in areas such as nutrition, public health, and medical technology.

Premedical or pre dental students are urged to consult with the preprofessional advisory committee early in their careers at Northeastern.

Bachelor of Arts Curriculum

BIO 1103, BIO 1104, BIO 1105, Principles of Biology 1, 2, and 3; BIO 1211, Environmental and Population Biology; BIO 1260, Genetics and Developmental Biology; BIO 1261, Introductory Biochemistry; and four advanced biology electives approved by department Advisory Committee.

MTH 1106, Fundamentals of Mathematics, MTH 1107, Functions and Basic Calculus, *or* Calculus (one year); PHY 1201, PHY 1202, and PHY 1203, Physics for the Life Sciences 1, 2, and 3, and PHY 1501, PHY 1502, Physics Lab for the Life Sciences 1 and 2, *or* PHY 1221 and PHY 1222, Physics for Science and Engineering Students 1 and 2, and PHY 1521 and PHY 1522, Physics Lab for Science and Engineering Students 1 and 2, *or* PHY 1223, Physics for Science and Engineering Students 3 and PHY 1523, Physics Lab for Science and Engineering Students 3; CHM 1111, General Chemistry I; CHM 1122, General Chemistry 2; CHM 1221, Analytical Chemistry; and CHM 1264, CHM 1265, Organic Chemistry 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

BIO 1103, BIO 1104, and BIO 1105, Principles of Biology 1, 2, and 3; BIO 1211, Environmental and Population Biology; BIO 1260, Genetics and Developmental Biology; BIO 1261, Introductory Biochemistry; BIO 1490, Senior Seminar; four advanced biology electives approved by department Advisory Committee.

Calculus (one year); PHY 1221, PHY 1222, and PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; PHY 1531, PHY 1532, Physics Lab for Science Majors 1 and 2 *or* PHY 1523, Physics Lab for Science and Engineering Students 3; CHM 1111 and CHM 1122, General Chemistry 1 and 2; CHM 1221, Analytical Chemistry; CHM 1264 and CHM 1265, Organic Chemistry 1 and 2; and two additional advanced science electives approved by department Advisory Committee.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

A minor in biology consists of any six biology courses for which the student has the prerequisites, plus two more courses in biology or other departments that serve as prerequisites for biology courses. At least five of the total eight courses must include laboratory, and a student may not count toward the biology minor more than one course, or course sequence, that covers substantially the same material.

To accommodate the needs of students majoring in different fields, the biology minor requirements have been phrased in a general and flexible way. To ensure that course selection is sound and appropriate to the student's background, each student's biology minor program must receive the signed approval of the biology minor advisor before the student has completed the first biology course.

Suggested course groupings for a biology minor have been developed for students with different backgrounds in college mathematics and science. The core minor for students with considerable work in mathematics, chemistry, or physics provides the foundation on which a biology major is built, without advanced specialization. For students with less college mathematics/science background, or none, three other minor options provide the opportunity for first-level exposure to the basic principles of biology. This option also gives students an opportunity to achieve some advanced specialization in plant and/or animal studies or to explore human biology, molecular biology, biochemistry, and the problems of the environment.

For further information, contact the biology minor adviser in 414 Mugar, 373-2260.

Chemistry

Philip M. Warner, PhD, *Professor and Chair*

Professors

Geoffrey Davies, PhD
David A. Forsyth, PhD
Bill C. Giessen, DrScNat
Barry L. Karger, PhD
Philip W. LeQuesne, PhD, DSci
Mary Jo Ondrechen, PhD
William M. Reiff, PhD
John L. Roebber, PhD
Alfred Viola, PhD
Paul Vourros, PhD

Associate Professors

Thomas R. Gilbert, PhD
Ira S. Krull, PhD
Kay D. Onan, PhD
Robert N. Wiener, PhD

Assistant Professors

David J. Jebaratnam, PhD
Lutfur R. Khundkar, PhD
Rein U. Kirss, PhD.
Patricia A. Mabrouk, PhD

Professor Emeritus

Robert F. Raffaui, PhD

Laboratory Coordinator

Edward H. Witten, PhD

The study of chemistry focuses on the structure and properties of substances and the transformations they undergo. The department seeks to help students experience the intellectual stimulation of studying a physical science; grasp the basic principles and techniques of chemistry; and prepare for graduate study in chemistry, medicine, dentistry, or many other related fields.

Students in our Cooperative Education program can obtain invaluable practical professional experience to augment their classroom work. For many, these practical applications help to put their course work into a logical framework and help provide perspective. Electives, especially in the last two years, allow students to concentrate in those areas which have a special interest for them. The department encourages qualified students to undertake a research project under the supervision of a faculty member. An honors program is open to particularly able students. Students who plan to pursue graduate study in the sciences should study either German or Russian.

The department publishes *Chemistry at Northeastern*, a pamphlet that details the chemistry major requirements. Copies may be obtained from 102 Hurtig Hall.

There are two degrees offered in chemistry, the Bachelor of Science and the Bachelor of Arts. The Bachelor of Science degree has more explicit scientific course requirements, while the Bachelor of Arts degree has more extensive requirements outside of the sciences. Both of the programs at Northeastern are approved by the American Chemical Society. The Bachelor of Science degree meets the society's requirements for certification; certified graduates are eligible for full membership in the society after two years of professional experience.

Challenging career opportunities exist in technical fields involving research, development, production, sales, market analysis, quality control, and management. As a result of their co-op experiences, graduating students are unusually well prepared for the next step in their professional careers. Alumni have found positions in chemical sales; clinical, medicinal, pharmaceutical, and forensic chemistry; and geochemistry, mineralogy, and environmental chemistry.

Bachelor of Arts Curriculum

CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1153, The Chemical Elements; CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1271, CHM 1272, CHM 1273, Organic Chemistry for Chemistry Majors and Chemical Engineering Students 1, 2, and 3; CHM 1381, CHM 1382, CHM 1383, Physical Chemistry 1, 2, and 3; CHM 1394, CHM 1395, CHM 1396, Experimental Physical Chemistry 1, 2, and 3; CHM 1422, Instrumental Methods of Analysis; and CHM 1432, Instrumental Analysis Lab.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, Calculus and Linear Methods 1 or MTH 1223, Calculus 4; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; and PHY 1522, PHY 1533, Physics Lab for Science Majors 2 and 3.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

CHM 1151, CHM 1152, General Chemistry for Science Majors 1 and 2; CHM 1153, The Chemical Elements; CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1271, CHM 1272, CHM 1273, Organic Chemistry for Chemistry Majors and Chemical Engineering Students 1, 2, and 3; CHM 1381, CHM 1382, CHM 1383, Physical Chemistry 1, 2, and 3; CHM 1394, CHM 1395, CHM 1396, Experimental Physical Chemistry 1, 2, and 3; CHM 1422, Instrumental Methods of Analysis; CHM 1432, Instrumental Analysis Lab; CHM 1441, Advanced Inorganic Chemistry; CHM 1451, Experimental Inorganic Chemistry; CHM 1461, Identification of Organic Compounds; CHM 1811, Advanced Chemical Lab Practice 1; and two advanced science or mathematics electives.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, Calculus and Linear Methods 1 or MTH 1223, Calculus 4; MTH 1245, Differential Equations and Linear Methods 1 or MTH 1225, Mathematical Analysis; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; and PHY 1522, PHY 1533, Physics Lab for Science Majors 2 and 3.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

After a general chemistry sequence, CHM 1231, Analytical Chemistry for Chemistry Majors; CHM 1271, CHM 1272, CHM 1273, Organic Chemistry for Chemistry Majors and Chemical Engineering Students 1, 2, and 3; CHM 1381, CHM 1382, Physical Chemistry 1 and 2; and CHM 1394, CHM 1395, Experimental Physical Chemistry 1 and 2.

Communication Studies

Richard A. Katula, PhD, *Professor and Chair*

Associate Professors

Karen S. Buzzard, PhD
Carl W. Eastman, MA
Joanne Morreale, PhD
Michael L. Woodnick, MS
Alan J. Zaremba, PhD

Assistant Professors

Simon Jones, PhD
Anne Mattina, PhD

Instructors

Thomas Shaker, MA
Sherry Shepler, MA

Communication studies offers students a humanities-based, liberal arts education coupled with pre-professional training.

Students who major in communication studies learn to speak articulately and persuasively in a variety of situations, understand the history and traditions of the field of communication, and comprehend the business and technology of the communications industry. The program also helps students appreciate the aesthetics of human communication, communicate effectively in complex organizations such as businesses and government agencies, understand theories of human communication and research methods used to develop and support those theories, and effectively criticize and consume messages produced in public argument and mass communication media.

The department offers coursework in speech skill development, radio and television production and broadcasting, communication theories, and criticism.

**Bachelor of Arts and
Bachelor of Science
Curriculum**

CMN 1115, Foundations of Communication; CMN 1116, Public Speaking; CMN 1250, Introduction to Mass Communication; CMN 1300, Communication Theory; CMN 1330, Interpersonal Communication; CMN 1600, Introduction to Communication Research; and CMN 1610, Rhetorical Criticism.

In addition to the core courses, communication studies majors may choose from one of three concentrations: speech and rhetoric, organizational communication, and radio and television. Concentrations require five courses. In addition, three upper-level communication studies courses are required to complete the major.

Concentration in speech and rhetoric. CMN 1110, Voice and Articulation; CMN 1111, Oral Interpretation of Literature; CMN 1210, Advanced Voice and Articulation; CMN 1211, Advanced Oral Interpretation; CMN 1232, Communication and Gender; CMN 1239, Argumentation and Debate; CMN 1240, Advanced Studies in Speech Performance; CMN 1310, Classical Age in Speech and Rhetoric; CMN 1315, Theories of Persuasion; CMN 1410, Contemporary Public Address; CMN 1415, Persuasion in Contemporary Culture; and CMN 1500, Special Topics in Communication Studies.

Concentration in organizational communication. CMN 1232, Communication and Gender; CMN 1315, Theories of Persuasion; CMN 1318, Negotiation Skills; CMN 1331, Advanced Interpersonal Communication; CMN 1338, Group Discussion; CMN 1430, Organizational Communication; CMN 1431, Advanced Organizational Communication; CMN 1437, Consultation Skills; CMN 1453, Broadcast Management; CMN 1500, Special Topics in Communication Studies; CMN 1555, Communication and the Quality of Life.

Concentration in radio and television. CMN 1232, Communication and Gender; CMN 1315 Theories of Persuasion; CMN 1317, The Audience in Mass Communication; CMN 1415, Persuasion in Contemporary Culture; CMN 1450, Television Studio Production; CMN 1451, Foundation of Broadcast Technology; CMN 1452, Radio Production; CMN 1453, Broadcast Management; CMN 1454, Programming for Radio and Television; CMN 1455, Television Field Production; CMN 1554, Special Topics in Media.

CMN 1895, CMN 1896, Internship in Communication Studies, and CMN 1890, CMN 1891, CMN 1892, Directed Study, may be taken for credit in any of the three concentration areas.

Minor Curriculum

CMN 1116, Public Speaking; CMN 1300, Introduction to Communication Theory; CMN 1330, Interpersonal Communication; and CMN 1338, Group Discussion.

Four courses from the following: CMN 1110, Voice and Articulation; CMN 1111, Oral Interpretation of Literature; CMN 1232, Communication and Gender; CMN 1239, Argumentation and Debate; CMN 1250, Introduction to Mass Communication; CMN 1318, Negotiation Skills; CMN 1331, Advanced Interpersonal Communication; CMN 1410, Contemporary Public Address; CMN 1415, Techniques of Persuasion; CMN 1437, Consultation Skills; CMN 1430, Organizational Communication; CMN 1600, Introduction to Communication Research; and CMN 1610, Rhetorical Criticism.

Economics

John Adams, PhD, *Professor and Chair*

Professors

M. Shahid Alam, PhD
 Conrad P. Caligaris, PhD
 Harold M. Goldstein, PhD
 Irwin L. Herrnsstadt, PhD
 Sungwoo Kim, PhD
 Steven A. Morrison, PhD
 Gustav Schachter, PhD
 Andrew M. Sum, MA

Associate Professors

Neil O. Alper, PhD
 Bruce R. Bolnick, PhD
 Oscar T. Brookins, PhD
 Kamran N. Dadkhah, PhD
 Alan W. Dyer, PhD
 Barbara M. Fraumeni, PhD
 Gregory Wassall, PhD

Assistant Professors

Gopa Chowdhury-Bose, PhD
 Jonathan H. Haughton, PhD
 Manfred W. Keil, PhD
 Katherine A. Kiel, PhD
 Laraine V. Lomax, PhD
 Fred K. Luk, PhD
 Stephen L. Parente, PhD
 George A. Plesko, PhD

Professor Emeritus

Morris A. Horowitz, PhD

Economics is the study of how societies produce and exchange goods and services to satisfy material needs. Economists analyze the process of economic growth and change and identify policies that contribute to its success or failure.

In the economics program students examine the sources of economic growth—how societies produce more of what they need. Undergraduates study economics as part of a broad interest in the social sciences to develop specialized skills useful in today's complex labor market. The major in economics is a good foundation for graduate studies in advanced economics, public policy, law, or business.

Macroeconomics, which focuses on the overall economy, deals with such problems as inflation, unemployment, growth and instability, economic development, and governmental monetary and fiscal policies.

Microeconomics examines the economic behavior of individuals, households, firms, industries, and trade among countries. It seeks to assess the economic effects of market power and environmental damage and analyzes the economic aspects of natural resources, poverty, health, income distribution, trade unions, and government regulation.

Courses in economics cover international trade; the behavior of families, firms, and industries in the market economy; the environmental costs of growth; and the economic aspects of natural resources, poverty, health, labor market discrimination affecting women and minorities, trade unions, and governmental oversight. International and comparative perspectives are emphasized, most directly in courses in economic development of the Third World and economic history.

Graduates may find jobs in federal, state, and local governments, major corporations, or financial institutions. Their work may involve planning and forecasting, assessing labor needs, and making financial studies. They may estimate consumer demand for new products, conduct research, teach, or provide specialized consulting services.

Bachelor of Arts Curriculum

ECN 1115, Principles of Macroeconomics; ECN 1116, Principles of Microeconomics; ECN 1250, ECN 1251, Statistics 1 and 2; ECN 1215, Macroeconomic Theory; ECN 1216, Microeconomic Theory; ECN 1337, History of Economic Thought; six economics electives. MTH 1113, College Mathematics for Business and Economics; MTH 1114, Calculus for Business and Economics; and four social science electives other than economics.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

ECN 1115, Principles of Macroeconomics; ECN 1116, Principles of Microeconomics; ECN 1250, ECN 1251, Statistics 1 and 2; ECN 1215, Macroeconomic Theory; ECN 1216, Microeconomic Theory; ECN 1350, Introduction to Econometrics or ECN 1351, Problems in Economic Research; and ten economics electives. MTH 1113, College Mathematics for Business and Economics; MTH 1114, Calculus for Business and Economics; and four social science electives other than economics.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

ECN 1115, Principles of Macroeconomics; ECN 1116, Principles of Microeconomics; ECN 1215, Macroeconomic Theory; ECN 1216, Microeconomic Theory; and four electives in economics. Electives to be selected with the advice of a department adviser and cannot include ECN 1250, Statistics 1, or ECN 1251, Statistics 2, if comparable courses are required by the major department. Any course taken outside the Department of Economics to satisfy these economics elective requirements must be approved by a faculty adviser in the department.

Education

Maurice Kaufman, PhD, *Professor and Chair*

Professors

John D. Herzog, PhD
Mervin D. Lynch, PhD
Sandra M. Parker, EdD

Associate Professors

Nicholas J. Buffone, PhD
Leslie A. Burg, EdD
Mary J. Lee, MEd
Joseph Meier, EdD
Irene A. Nichols, EdD
Barbara A. Schram, EdD

Assistant Professor

Thomas H. Clark, MA

The Department of Education helps students to understand principles of curriculum, instruction, and evaluation; to analyze and think critically about teaching and learning; to communicate effectively; and to understand the legal and moral responsibilities of the teaching profession. The department offers undergraduate programs that enable students to obtain provisional Massachusetts teacher certification, which is recognized in other states. (Full certification requires a master's degree.) All students who seek teaching certificates in Massachusetts need degrees that consist of a major in the arts and sciences and a program of study in education. Students acquire specified competencies established for certification in Massachusetts through designated courses, related fieldwork, cooperative education experiences, and full-time student teaching arranged by the education department.

Early Childhood Education and Elementary Education

Students who wish to obtain certification as early childhood or elementary education teachers should enroll in the education/arts and sciences dual-major program. Advisers help students plan appropriate programs that consist of a major in education, a major in the arts and sciences, and college core requirements. Students in this program are expected to participate in co-op and course-related fieldwork.

Elementary education major. CRS 1200 Introduction to Special Education; ED 1101, Education for the Future; ED 1102, Human Development and Learning 1; ED 1104, Analysis of the Instructional Process; ED 1306, Measurement and Evaluation; ED 1405, Literature and Learning Materials; ED 1406, ED 1407, Elementary Curriculum 1 and 2; ED 1417, Student Teaching and Seminar; ED 1425, Elementary School Science and Mathematics; ED 1426, Fundamentals of Reading; and HSL 1151, Movement Education.

Early childhood education major. CRS 1200, Introduction to Special Education; ED 1101, Education for the Future; ED 1102, Human Development and Learning 1; ED 1104, Analysis of the Instructional Process; ED 1105, Day Care and Nursery School; ED 1306, Measurement and Evaluation; ED 1318, Seminar in Early Childhood Development; ED 1319, Speech, Language and Cognition in the Young Child; ED 1405, Literature and Learning Materials; ED 1406, ED 1407, Elementary Curriculum 1 and 2; ED 1417, Student Teaching and Seminar; ED 1425, Elementary School Science and Mathematics; ED 1426, Fundamentals of Reading; and HSL 1265, Early Childhood Perceptual Motor Development.

Secondary Education

Students seeking high-school teacher certification should enroll in an arts and sciences major and a minor in secondary education.

Students preparing to teach biology, chemistry, earth science (geology), English, history, mathematics, physics, or foreign languages in Massachusetts schools should major in the pertinent field. Students majoring in economics, history, political science, or sociology may pursue certification in the teaching of social studies.

Secondary education minor. CRS 1200, Introduction to Special Education; ED 1103, Human Development and Learning 2; ED 1104, Analysis of the Instructional Process; ED 1306, Measurement and Evaluation; ED 1410, ED 1411, Methods and Materials for Teaching Adolescents 1 and 2; ED 1412, Fundamentals of Curriculum Development; and ED 1417, Student Teaching and Seminar.

Student Teaching

Student teaching is a full-time experience for one quarter of the senior year. A professor and a cooperating classroom teacher share supervisory responsibility.

English

Stuart S. Peterfreund, PhD, *Professor and Chair*

Professors

Samuel J. Bernstein, PhD
 Robert J. Blanch, PhD
 Francis C. Blessington, PhD
 Irene Fairley, PhD
 Gary Goshgarian, PhD
 Earl N. Harbert, PhD
 M. X. Lesser, Ph.D.
 James E. Nagel, PhD
*Stanton W. and Elisabeth K.
 Davis Professor of American
 Literature*
 Kinley E. Roby, PhD
 Guy Rotella, PhD
 Michael Ryan, PhD
 Herbert L. Sussman, PhD
 Arthur J. Weitzman, PhD
 Joseph E. Westlund, PhD

Associate Professors

Timothy R. Donovan, PhD
 Maryemma Graham, PhD
 Gerald R. Griffin, PhD
 Janet Randall, PhD
 Kristin Woolever, PhD

Lecturers

Joseph B. deRoche, MFA
 David W. Tutein, MA

Assistant Professors

Kathy Howlett, PhD
 Kathleen Kelly, PhD
 Marina Leslie, PhD
 Mary K. Loeffelholz, PhD
 Linda Loehr, PhD
 Susan Wall, PhD

The department offers courses in creative, expository, and technical writing; linguistics; literary studies; and American and British literature.

Students who have completed the freshman English requirement and are in good academic standing may major or minor in English. The broad-based major requires proficiency in a number of approaches—including historical, generic, and theoretical—to the study of language and literature. The more narrowly focused minor gives students intensive exposure to literature, writing, linguistics, or technical communication.

English majors prepare for careers in teaching and research, advertising and publishing, radio and television—any field in which communication and critical judgment go hand in hand. The department also offers an intellectual and cultural framework for preprofessional students in law, medicine, business, engineering, or computer science.

Bachelor of Arts and Bachelor of Science Curriculum

ENG 1126, Backgrounds in English and American Literature; ENG 1120, ENG 1121, Survey of English Literature 1 and 2; ENG 1123, ENG 1124, Survey of American Literature 1 and 2; ENG 1307, Approaches to Literature; two period courses; three major figure courses (one must be Shakespeare); one language or writing course; one genre course; one alternative literature course; one junior/senior seminar; and three electives in English.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor in Literature Curriculum

Six courses required, two from the following: ENG 1120, Survey of English Literature 1; ENG 1121, Survey of English Literature 2; ENG 1123, Survey of American Literature 1; ENG 1124, Survey of American Literature 2; one course from two of the following categories: (a) literary periods, (b) major figures, and (c) language and writing; one elective from (a), (b) or (c); a junior/senior seminar.

Minor in Writing Curriculum

Six courses required, four from the following: ENG 1350, Intermediate Writing; ENG 1351, Creative Writing; ENG 1125, Technical Writing 1; ENG 1370, Technical Writing 2; ENG 1352, Advanced Writing; ENG 1381, Writing for the Professions: Business Administration; ENG 1382, Writing for the Professions: Criminal Justice; ENG 1357, Poetry Workshop; ENG 1358, Fiction Workshop; ENG 1362, Publication Arts; ENG 1359, Nonfiction Workshop; and two writing or literature electives.

Minor in Linguistics Curriculum

See page 52.

Minor in Technical Communication Curriculum

See page 33.

Geology

Richard H. Bailey, PhD, *Professor and Chair*

Professors

Richard S. Naylor, PhD
William A. Newman, PhD

Associate Professors

Bernard L. Gordon, MS
Malcolm D. Hill, PhD
Peter S. Rosen, PhD
Martin E. Ross, PhD

Geology is a broad-based science that deals with the study of the physical features, composition, history, and processes of the earth. Many geologists today are working to solve environmental problems, to develop and protect water resources, and to discover new deposits of minerals and fossil fuels.

Bachelor of Science and Bachelor of Arts programs are offered in geology and in environmental geology. These programs require coursework in mathematics (through calculus), physics, and chemistry, and a set of required and elective geology courses. All students complete the College of Arts and Sciences core. Students in the Bachelor of Arts programs take a broader array of non-science courses and must demonstrate proficiency in a foreign language (through intermediate II level). Courses in the geology major focus on the basic composition (mineralogy and petrology), structure (structural geology and stratigraphy), and surface of the earth (geomorphology and geochemistry). The environmental geology major has a greater emphasis on earth surface processes, human interactions, and land-use planning. Typical environmental geology courses include hydrogeology, land-use planning, water in environmental planning, groundwater geochemistry, and coastal processes.

Fieldwork is an essential component of training in geology, and many of our courses utilize field sites throughout New England to demonstrate geological processes. In addition to these local trips, the department has taken students on longer field excursions to the Cascade Mountains of Washington, to the island of San Salvador in the Bahamas, and to the Black Hills of South Dakota. Students also have the option to complete undergraduate research courses with a faculty member. Undergraduate research projects usually involve substantial field and lab work completed under the guidance of the geology faculty. Honors students in geology have the opportunity to participate in special sections of geology courses and in special honors activities.

The geology program offers basic knowledge needed to work in almost any of the geologic professions in both industry and government, or to continue studies in graduate school. The major in environmental geology is particularly popular, and many of our recent graduates work for environmental or geotechnical firms. Students involved in the optional co-op plan typically work with local engineering or environmental consulting companies. These jobs often involve assessing building sites, evaluating land use, and studying many problems concerned with groundwater contamination and remediation.

Bachelor of Arts in Geology Curriculum

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1310, Descriptive Mineralogy; GEO 1308, Petrology; GEO 1440, Geomorphology; GEO 1418, Structural Geology; and five geology electives.

MTH 1106, Fundamentals of Mathematics and MTH 1107, Functions and Basic Calculus *or* MTH 1107, Functions and Basic Calculus and MTH 1108, Calculus; PHY 1221, Physics for Science and Engineering Students *or* PHY 1201, Physics for the Life Sciences 1; CHM 1111, CHM 1122, General Chemistry 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science in Geology Curriculum

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1310, Descriptive Mineralogy; GEO 1311, Optical Crystallography; GEO 1308, Petrology; GEO 1418, Structural Geology; GEO 1440, Geomorphology; and eight geology electives.

MTH 1107, Functions and Basic Calculus and MTH 1108, Calculus *or* MTH 1123, MTH 1124, and MTH 1125, Calculus 1, 2, and 3; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; CHM 1111, CHM 1122, General Chemistry 1 and 2; CHM 1221, Analytical Chemistry *or* GEO 1412, Geochemistry; and two approved additional science electives.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor in Geology Curriculum

GEO 1212, Physical Geology; GEO 1222, Historical Geology; GEO 1308, Petrology; GEO 1213, Physical Geology Lab; GEO 1223, Historical Geology Lab; plus four geology electives (GEO 1250 or higher number) chosen with the approval of the geology department.

Bachelor of Arts in Environmental Geology

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1308, Petrology; GEO 1440, Geomorphology; GEO 1438, Geology and Land-use Planning; and five geology electives.

MTH 1107, Functions and Basic Calculus and MTH 1108, Calculus *or* MTH 1106, Fundamentals of Mathematics and MTH 1107, Functions and Basic Calculus; BIO 1103, BIO 1104, Principles of Biology 1 and 2; CHM 1111, CHM 1122, General Chemistry 1 and 2.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science in Environmental Geology Curriculum

GEO 1212, Physical Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1308, Petrology; GEO 1310, Descriptive Mineralogy; GEO 1440, Geomorphology; GEO 1438, Geology and Land-Use Planning; GEO 1442, Water in Environmental Planning; and eight geology electives.

MTH 1107, Functions and Basic Calculus; MTH 1108, Calculus; PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3 *or* BIO 1103, BIO 1104, BIO 1105, Principles of Biology 1, 2, and 3; CHM 1111, CHM 1122, General Chemistry 1 and 2; and CHM 1221, Analytical Chemistry *or* GEO 1412, Geochemistry; and two approved additional science electives.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor in Environmental Geology Curriculum

GEO 1212, Physical Geology *or* GEO 1140, Environmental Geology; GEO 1213, Physical Geology Lab; GEO 1222, Historical Geology; GEO 1223, Historical Geology Lab; GEO 1438, Geology and Land-Use Planning; plus four geology electives (GEO 1250 or higher number) chosen with the approval of the geology department.

History

William M. Fowler, Jr., PhD, *Professor and Chair*

Professors

Philip N. Backstrom, PhD
Ballard C. Campbell, PhD
William M. Fowler, Jr., PhD
Donald M. Jacobs, PhD
Patrick Manning, PhD
Anthony N. Penna, DA
John D. Post, PhD
Raymond H. Robinson, PhD

Associate Professors

Charmarie J. Blaisdell, PhD
Laura L. Frader, PhD
Harvey Green, PhD
Clay McShane, PhD

Assistant Professors

Christina Gilmartin, PhD
Gerald H. Herman, MA
Wilfrid Rollman, PhD

A major in history, which examines humanity's diverse and complex past, provides students with an excellent opportunity to develop a greater understanding and appreciation of today's cultures and civilizations.

The department offers two degree programs: a Bachelor of Arts, for students preparing for graduate work in history or for teaching careers; and the Bachelor of Science, designed for students planning careers in public history fields or in the "new history" areas that require technical understanding of the social sciences.

All history majors are required to take courses in Western or world civilization, American history, and historical methodology, as well as a range of history electives that explore diverse periods and locales. Students finish the major with a seminar in Approaches to History, in which they complete a substantial research project that demonstrates both substantive and methodological expertise. Eligible students are encouraged to test themselves by doing an honors thesis. Students also have the opportunity, through directed study, to work on an individual basis with senior faculty on topics of mutual interest.

The major also provides students with opportunities to work as historians-in-training in diverse settings through cooperative education placements, fieldwork, internships, and other experiential learning activities. Students who use the major as a broad-based preparation for careers in business, law, journalism, or government have opportunities for relevant cooperative education experiences in the business and professional worlds.

Many history majors want to work directly in their field of study. Those who plan to teach in public school may combine history with education courses that can lead to state certification; those who plan to teach in private secondary schools need not be certified by state authorities. Teaching positions in colleges and universities require master's and doctoral degrees.

Many professional historians teach and write; others work in public archives, private historical societies, museums, government agencies, media, and restoration projects.

Bachelor of Arts Curriculum

HST 1101, Western Civilization to 1648 *or* HST 1121, World Civilization to 1648 *or* HST 1122, World Civilization since 1648; HST 1102, Western Civilization since 1648; HST 1201 and HST 1202, The United States to 1877 and The United States since 1877; HST 1241, The Historian's Craft; HST 1805, Approaches to History; nine history electives distributed as follows: two courses in Group A (ancient, medieval, and early modern Europe); two courses in Group B (modern Europe); two

courses in Group C (America); two courses in Group D (other regions); and one course in any of the above groups.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

HST 1101, Western Civilization to 1648 *or* HST 1121, World Civilization to 1648 *or* HST 1122, World Civilization since 1648; HST 1102, Western Civilization since 1648; HST 1201 and HST 1202, The United States to 1877 and The United States since 1877; HST 1241, The Historian's Craft; HST 1805, Approaches to History; eleven history electives distributed as follows: two courses in Group A (ancient, medieval, and early modern Europe); two courses in Group B (modern Europe); two courses in Group C (America); two courses in Group D (other regions); and three courses in any of the above groups.

A minor approved by the student's adviser; a statistics course (for example, PSY 1211, SOC 1320, or ECN 1250); and a computer course, preferably COM 1105.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

Eight courses in history, two of which must be selected from the following: HST 1101, Western Civilization to 1648; HST 1102, Western Civilization since 1648; HST 1201, The United States to 1877; and HST 1202, The United States since 1877.

Human Services

John D. Herzog, PhD, *Co-Director and Professor, Education*

Wilfred E. Holton, PhD, *Co-Director and Associate Professor, Sociology/Anthropology*

Advisory Committee

Patricia Fetter, PhD

Louise LaFontaine, EdD

Lawrence Litwack, EdD

Counseling Psychology,

Rehabilitation, and

Special Education

Gordana Rabrenovic, PhD

Sociology/Anthropology

David A. Rochefort, PhD

Political Science

Barbara A. Schram, EdD

Education

Martha Wengert, MEd

Cooperative Education

Harold S. Zamansky, PhD

Psychology

Human Services is an interdisciplinary major that combines psychology, sociology, education, political science, counseling, and other fields. Students take basic foundation courses, select specialization areas of their choice, and complete fieldwork internships in Boston area agencies. The major may lead to careers in the helping professions or to graduate programs in social work, counseling, rehabilitation, and law. Students who major in human services select specialization areas such as deaf studies, gerontology, adolescent issues, human services administration, drug and alcohol services, early childhood issues, special needs, and many more. Students prepare for positions in both public and private agencies including: case work in social service and welfare agencies; therapeutic treatment in mental health settings; rehabilitation counseling; parole and court outreach work in programs for delinquent youth; staff work in halfway houses, drug treatment institutions, and penal institutions; community organizing; services for the aging at home and in institutions; administration in human services agencies; evaluation and grant writing for social programs; and counseling and support for deaf clients through fluency in American Sign Language. Students in the major have special opportunities to participate in the Human Services Student Organization, and in the Fenway Project, which provides student volunteers to community agencies.

Bachelor of Arts Curriculum

Prerequisite courses. SOC 1100, Introduction to Sociology *or* ED 1100, Education and Social Science; ED 1302, Human Services Professions; PSY 1111, PSY 1112, Foundations of Psychology 1 and 2 *or* ED 1102, ED 1103, Human Development and Learning 1 and 2; POL 1111, Introduction to American Government *or* other basic political science course; ECN 1115, Principles of Macroeconomics *or* ECN 1116, Principles of Microeconomics *or* other basic economics course.

Core courses. PSY 1211, Statistics in Behavioral Science 1 *or* SOC 1320, Introduction to Statistical Analysis *or* ED 1307, Introduction to Educational Statistics; PSY 1511, Experimental Design in Psychology *or* SOC 1321, Research Methods 1 *or* SOC 1324, Human Services Research and Evaluation; SOC 1240, Sociology of Human Services Organizations; PSY 1272, Personality 1; PSY 1373, Abnormal Psychology 1; CRS 1314, Introduction to Counseling; SPC 1338, Group Discussion *or* SPC 1330, Interpersonal Communication 1; ED 1310, Intervention Strategies; INT 1333, Senior Seminar.

Fieldwork. INT 1336, INT 1337, Field Experience in Human Services 1 and 2.

Additional courses. Three courses focused on social and community issues such as poverty and welfare, minority affairs, or special needs populations, chosen with the student's academic adviser; and five courses in a particular specialization within human services, chosen with the student's academic adviser.

In addition, complete the arts and sciences core curriculum (see page 31).

Specialization in Deaf Studies Curriculum

Prerequisite, core and fieldwork courses as listed above. ASL 1101, ASL 1102, American Sign Language 1 and 2; ASL 1201, ASL 1202, Intermediate Sign Language 1 and 2; and one of the following: ASL 1211, Deaf Culture; ASL 1212, Deaf History; PSY 1363, American Sign Language Linguistics; or ASL 1401, American Sign Language Literature.

Minor in Human Services Curriculum

ED 1302, Human Services Professions; ED 1310, Intervention Strategies; INT 1336, Field Experience in Human Services 1; SOC 1240, Sociology of Human Services Organizations; and two human services specialization courses approved by a human services adviser.

Journalism

Nicholas Daniloff, MA, *Associate Professor and Director*

Associate Professor

William Kirtz, MS

Assistant Professors

Jerome M. Berger, MS

Kelley C. Chunn, MS

Charles F. Fountain, MS

Nancy Gallinger, MA

Andrew P. Jones, MS

James Ross, MS

William Smith, JD

Linda Conway Tompkins, MA

Professor Emeritus

LaRue W. Gilleland, MA

The School of Journalism prepares students for careers in news media and related fields. The skills it emphasizes—writing, editing, information gathering, photojournalism, and design and graphics—also have broad applications in numerous other disciplines.

The school offers four undergraduate concentrations: advertising, newspaper/print media, public relations, and radio/television news. Students may enroll in either a five-year cooperative education program or a four-year program without co-op. The school strongly advises students to obtain cooperative education experience.

The New England Press Association (NEPA), representing 350 newspaper publishers, maintains its office on the Northeastern campus. Students have the opportunity to attend seminars and conferences sponsored by NEPA and other organizations.

The school seeks to contribute to the existing body of knowledge in journalism and mass communications in areas that help news media practitioners and educators perform their jobs with increasing effectiveness. To that end the school sponsors professional workshops and seminars in cooperation with media and related agencies.

Graduates work for some of the world's best newspapers, radio and television stations, wire services, general and specialized magazines, public relations departments, and advertising agencies.

Each major will complete the journalism core and one of four concentrations.

JRN 1103, JRN 1104, Newswriting 1 and 2; JRN 1206, Editing; JRN 1250, Interpreting the Day's News; JRN 1301, Basic Photojournalism; JRN 1501, History of Journalism; JRN 1508, Law of the Press; and JRN 1512, Journalism Ethics and Issues.

Concentration in advertising. JRN 1350, Advertising Principles; JRN 1440, Design and Graphics; JRN 1451, Advertising Copy Writing; JRN 1552, Advertising Practice; and one journalism elective.

Concentration in newspaper/print media. JRN 1305, Techniques of Journalism; JRN 1432, Local Government Reporting; JRN 1440, Design and Graphics; JRN 1575, Publication Production and Management; and one journalism elective.

Concentration in public relations. JRN 1336, Public Relations Principles; JRN 1440, Design and Graphics; JRN 1460, Public Relations Problems; JRN 1561, Public Relations Practice; and one journalism elective.

Concentration in radio/television news. JRN 1320, Radio News Gathering and Writing; JRN 1421, Television Newswriting; JRN 1422, Television News Production; JRN 1890, Directed Study; and one journalism elective.

Additional requirements. ENG 1275, Grammar for Journalists; ENG 1110, ENG 1111, Freshman English 1 and 2. One course from this list: ENG 1120, Survey of English Literature 1; ENG 1121, Survey of English Literature 2; ENG 1123, Survey of American Literature 1; ENG 1124, Survey of

Bachelor of Arts and Bachelor of Science Curriculum

American Literature 2; and one additional English or American literature elective. POL 1310, American Ideology; POL 1318, State and Local Government; HST 1201, United States to 1877; HST 1202, United States since 1877; ECN 1115, Principles of Macroeconomics; and one additional course in economics or business; MTH 1152, Statistical Thinking; PHL 1200, Introduction to Logic I; PHL 1140, Social and Political Philosophy; two history electives; and COP 1135, Professional Development for Journalists. MUS 1109, Introduction to Art, Drama, and Music *or* one course from both of the following categories: (a) ART 1106, Introduction to Art; ART 1220, American Art; (b) MUS 1100, Introduction to Music; MUS 1101, Music as a Listening Experience.

Additional requirements for bachelor of arts. Three courses in science and/or math.

Additional requirements for bachelor of science. Six courses in science and/or math.

Students must also complete the arts and sciences core curriculum (see page 31).

Linguistics

Janet H. Randall, PhD, *Associate Professor of English and Coordinator of Linguistics Program*

Professors

Irene R. Fairley, PhD

English

Harlan Lane, PhD, Doc. ès

Lettres

Psychology

Joanne L. Miller, PhD

Psychology

Associate Professors

John N. Frampton, PhD

Mathematics

Michael R. Lipton, PhD

Philosophy and Religion

Assistant Professors

Nancy N. Soja, PhD

Psychology

Shari R. Speer, PhD

Psychology

Lynn M. Stephen, PhD

Anthropology

Adjunct Lecturer

Wendy J. Wiswall, PhD

Linguistics

Linguistics—the science of language—focuses on such issues as how children learn to speak, how we understand and produce language, and how language ties people together. The field also explores how language is structured and represented in the mind, why some people are better than others at acquiring a second language, how sign languages differ from spoken languages, and how language variation and diversity affect education.

Six departments (ASL, English, Modern Languages, Philosophy and Religion, Psychology, and Sociology and Anthropology) collaborate to offer a comprehensive linguistics program. The major reflects the current research of linguists, sociologists, psychologists, language educators, and teachers of second languages.

Almost all the linguistics courses have been approved for the honors program, and many of the majors and minors are honors program students.

Linguistics students have interesting co-op and foreign study opportunities. Several students have taken advantage of international co-op or study abroad. Many students have taken co-ops as research assistants to linguistic scholars, especially in Northeastern's own psycholinguistics laboratories.

Students with backgrounds in linguistics have pursued advanced degrees in fields including law, cognitive science, education, English, interpreting, business, speech pathology, computer science, and linguistics itself. Other graduates have gone on to work in research, translation, special-education, business, computer science, and law.

Bachelor of Arts Curriculum

ENG 1118, Introduction to Language and Linguistics; ENG 1401, Introduction to Syntax; LNL 1220, Introduction to Phonetics and Phonology; PHL 1215, Symbolic Logic; PSY 1262, Psychology of Language; SOA 1335, Language and Culture.

Five from the following (and other related courses by permission): ASL 1250, Linguistics of American Sign Language; ENG 1119, History of the English Language; ENG 1402, Grammars of English; ENG 1407, Semantics; ENG 1408, Topics in Linguistics; LNF 1250, History of the French Language; LNL 1235, Applied Linguistics; LNL 1236, Advanced Applied Linguistics; LNL 1240, Bilingualism; LNL 1260, Introduction to Romance Linguistics; LNS 1250, History of the Spanish Language; PHL 1440, Philosophy of Language; PSY 1263, Nonverbal Communication; PSY 1362, Child Language; PSY 1364, Cognition; PSY 1365, Language and the Brain; PSY 1562, Laboratory in Psycholinguistics; PSY 1564, Laboratory in Cognition.

Two from the following: ENG 1690, ENG 1691, Junior/Senior Seminar (linguistics, stylistics); PSY 1661, Seminar in Psycholinguistics; PSY 1662, Seminar in Cognition.

One from the following (in fieldwork, interpreting, teaching, etc.): ENG 1810, ENG 1811, Directed Study; LNG 1801, Directed Study; PHL 1800, Directed Study; PSY 1890, Directed Study; SOA 1800, Directed Study.

Second language requirement: Proficiency through Intermediate 2 level plus two advanced courses. The college language placement procedures determine proficiency in a spoken second language.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

Same as the Bachelor of Arts, except that American Sign Language can count toward the second language proficiency requirement.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

ENG 1118, Introduction to Language and Linguistics; one of the following: ENG 1401, Introduction to Syntax; LNL 1220, Introduction to Phonetics and Phonology; PSY 1262, Psychology of Language.

Four from the following: ASL 1250, Linguistics of American Sign Language; ENG 1119, History of the English Language; ENG 1401, Introduction to Syntax; ENG 1402, Grammars of English; ENG 1407, Semantics; ENG 1408, Topics in Linguistics; ENG 1690, ENG 1691, Junior/Senior Seminar (linguistics, stylistics); ENG 1810, 1811, Directed Study; LNF 1250, History of the French Language; LNG 1801, Directed Study; LNL 1220, Introduction to Phonetics and Phonology; LNL 1235, Applied Linguistics; LNL 1236, Advanced Applied Linguistics; LNL 1240, Bilingualism; LNL 1260, Introduction to Romance Linguistics; LNS 1250, History of the Spanish Language; PHL 1215, Symbolic Logic; PHL 1440, Philosophy of Language; PHL 1800, Directed Study; PSY 1262, Psychology of Language; PSY 1263, Nonverbal Communication; PSY 1362, Child Language; PSY 1364, Cognition; PSY 1365, Language and the Brain; PSY 1562, Laboratory in Psycholinguistics; PSY 1564, Laboratory in Cognition; PSY 1661, Seminar in Psycholinguistics; PSY 1662, Seminar in Cognition; PSY 1890, Directed Study; SOA 1335, Language and Culture; SOA 1800, Directed Study.

Mathematics

Richard D. Porter, PhD, *Professor and Chair*

Professors

Samuel J. Blank, PhD
Bohumil Cenk, ScD
Terence J. Gaffney, PhD
Alberto R. Galmarino, PhD
Maurice E. Gilmore, PhD
Mark Goresky, PhD
Arshag B. Hajian, PhD
Anthony Iarrobino, PhD
Venkatrama Lakshmibai, PhD
Marc N. Levine, PhD
Richard D. Porter, PhD
Fred S. Roberts, PhD
Egon Schulte, PhD
Jayant M. Shah, PhD
Mikhail Shubin, PhD
Gabriel Stolzenberg, PhD
Chuu-Lian Terng, PhD

Associate Professors

Mark Bridger, PhD
Robert W. Case, PhD
Stanley J. Eigen, PhD
John N. Frampton, PhD
Eugene H. Gover, PhD
Samuel Gutmann, PhD
Solomon M. Jekel, PhD
Donald R. King, PhD
Nishan Krikorian, PhD
N. V. R. Mahadev, PhD
Robert C. McOwen, PhD
Mark B. Ramras, PhD
Martin Schwarz, PhD
Thomas O. Sherman, PhD
Alexandru I. Suci, PhD
Gordana G. Todorov, PhD
Jerzy M. Weyman, PhD
Andrei V. Zelevinsky, PhD

Assistant Professors

Florin Avram, PhD
Jennie Hansen, PhD
Christopher K. King, PhD
Alex Martsinkovsky, PhD
David Massey, PhD
Carla B. Oblas, MS
Samuel S. Stueckle, PhD

Lecturers

Jane E. Devoe, MS
Robert A. Lupi, MS
Peter J. Philliou, MS
Steven W. Olson, ME

Professor Emeritus

Holland C. Filgo, PhD
Jack Warga, PhD

Mathematics has become the foundation and a rich source of methods for most scientific and technological research. Mathematicians possess the skill to analyze the crucial features of diverse problems and to apply rigorous techniques to solve them.

The Bachelor of Arts degree requires at least thirteen mathematics courses and three physics courses, in addition to the study of a foreign language; it is appropriate for students who wish a broader liberal arts education. The Bachelor of Science degree requires at least sixteen mathematics courses and three physics courses but no foreign language study; it is more specialized, and it is recommended for those strongly interested in mathematics and science. The department also offers a minor degree in mathematics.

The major programs provide flexibility with elective courses. Students may take advantage of a range of interdisciplinary programs and may join a major in mathematics with one in such fields as computer science, physics, engineering (six different majors), chemistry, biology and economics.

Strong students are accepted in the honors program, and have the option to enroll in honors sections of several of their mathematics courses. All math majors may benefit from co-op opportunities in the scientific business in Boston and elsewhere. Almost every job involves mathematically stimulating work that enables students to find out how math is used in the world around us.

The increasing use of computers in calculus and other mathematics courses gives students significant computer experience. The Mathematics Computer Center, completed in early 1993, is the nucleus of a "mathematical culture" that links students to applications via computer.

Students planning to teach secondary-school mathematics must major in mathematics and take a specific minor in education, which includes coursework and student teaching.

Mathematical training may lead to opportunities in applied research (natural sciences, engineering, economics, management, computer science) as well as in mathematical research, teaching, or industry.

Bachelor of Arts Curriculum

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus 4 and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2; MTH 1238, Combinatorial Mathematics; MTH 1301, Linear Algebra; MTH 1311, Analysis 1; and three approved mathematics electives selected in consultation with an adviser.

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus 4 and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2; MTH 1238, Combinatorial Mathematics; MTH 1301, Linear Algebra; MTH 1311, Analysis 1; and six approved mathematics electives selected in consultation with an adviser.

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering 1, 2, and 3.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

Eight MTH courses, of which the following four are required: three courses in calculus (MTH 1140, MTH 1141, MTH 1142, or equivalent); and MTH 1238, Combinatorial Mathematics. (MTH 1137 and MTH 1237 together are permitted to substitute for MTH 1238. If this option is elected, then nine courses are required for the minor.) The remaining four courses are selected with the assistance of a departmental adviser. At least two of these are upper-division mathematics electives (courses with numbers between MTH 1301 and MTH 1399 excluding MTH 1301, MTH 1311, and MTH 1384). None of the four may carry or be equivalent to a number lower than MTH 1200.

Modern Languages

Holbrook C. Robinson, PhD, *Associate Professor and Chair*

Professor

Inez Hedges, PhD
Constance H. Rose, PhD

Associate Professors

Lillian Bulwa, PhD
Walter M. Gershuny, PhD
Juliette M. Gilman, PhD
Neil A. Larsen, PhD
Bonnie S. McSorley, PhD
Stephen A. Sadow, PhD
John Spiegel, PhD

Assistant Professor

Robert B. Modee, MA

The study of modern languages can benefit all students, regardless of their majors. The multicultural world in which we live requires increased communication among varied and often divergent cultures. Learning a new language and its culture enables students to cross cultural barriers and to achieve a more cosmopolitan, open-minded, and sensitive view of the world.

The rationale behind all the majors in the department is the same: to ensure that students become as fluent as possible in a given language, and to introduce them to the relevant culture of that language. For this reason, the students take a number of language classes as well as literature, cinema, and general civilization courses. In addition, students are urged to consider participating in international co-op, which prepares students to function on an everyday level in a foreign country.

The major in modern languages is available in French and Spanish; it is also possible with special departmental permission to pursue a major in Italian, Russian, and German. Where possible, it is preferable to minor in Italian, Russian, or German, since smaller numbers of advanced courses are routinely offered by the department in these languages than in French and Spanish. The majors in French and Spanish are outlined below.

A major in a modern language can form the basis for careers in teaching at the elementary, secondary, or college level; international business relations; high-tech fields; government service; journalism; library science; world affairs; travel; and community service, especially in Spanish-speaking areas.

Bachelor of Arts in French Curriculum

LNF 1201, Intensive Review of French, LNF 1202, LNF 1203, and LNF 1204, French Composition and Conversation 2, 3, and 4; LNF 1512, Masterpieces of Modern European Fiction; LNF 1231 and LNF 1232, Masterpieces of French Literature 1 and 2; LNF 1225, Introduction to the French Speaking World; LNF 1309, LNF 1310, LNF 1311 and LNF 1312, French Literature of the Nineteenth through Twentieth Centuries; ENG 1118, Introduction to Linguistics; and LNL 1260, Introduction to Romance

**Bachelor of Arts in
Spanish Curriculum**

Linguistics. As an ancillary course, students are encouraged to take at least one elective pertaining to France.

Group I: LNS 1203 and LNS 1204, Composition and Conversation 3 and 4. Group II (prerequisite LNS 1204): LNS 1231, LNS 1232, Masterpieces of Spanish Literature 1 and 2; LNS 1316, Latin American Literature 2. Group III: LNS 1500, Backgrounds of Spanish Culture *or* LNS 1501, Backgrounds of Latin American Culture. Group IV (prerequisites Groups I and II), take four: LNS 1301, Medieval Literature; LNS 1303, 15th and 16th Century Literature; LNS 1306, Golden Age Theater; LNS 1309, LNS 1310, 19th Century Literature 1 and 2; LNS 1311, LNS 1312, 20th Century Literature 1 and 2; LNS 1315, Latin American Literature 1; LNS 1506, Cervantes; LNS 1511, Caribbean Literature. Group V, open electives: LNL 1235, Applied Linguistics; LNL 1250, Introduction to Romance Linguistics; LNS 1260, History of the Spanish Language; LNS 1400, Spanish Seminar (topic varies); LNS 1510, Saints and Sinners; LNS 1512, Don Juan; LNS 1550 Spanish Civil Wars in Spanish Film. Ancillary courses: Two courses from the social sciences pertaining to Latin America, Latino Studies or Europe and one course in linguistic reasoning.

Minor Curriculum

Six advanced courses (above 104 level); two courses in composition and conversation; one of the Masterpieces of Literature series (1231, 1232); one culture course; and two electives.

Since the German, Italian, and Russian sections of the department have limited course offerings, students are advised to begin their study of these languages as early as possible, and to coordinate carefully their programs with their language adviser.

Music

David D. Sonnenschein, DMA, *Associate Professor and Chair*

Professors

Reginald W. Haché, ArtDip
Joshua R. Jacobson, DMA
Roland L. Nadeau, MM
Judith Tick, PhD

Associate Professors

William Lowe, MA
Dennis H. Miller, DMA

Assistant Professors

Susan Asai, PhD
Leonard L. Brown, PhD
Bruce Ronkin, DMA

Lecturers

Marjorie J. Atlas, MM
Paul Beadoin, MM
Douglas F. Durant, PhD
Virginia Eskin, BA
Leon C. Janikian, MM
Michael Manning, MM
Karen L. Pokross, EdM
Jeanne M. Segal, MM
Robert Ward, MM

Visiting Faculty

Allen G. Feinstein, MM

The music department approaches the study and performance of music from a global perspective. The multicultural treatment of the musical arts expands on Western civilization's achievements and affirms that the music of other civilizations, with different musical traditions, is equally worthy of performance and serious study.

The department offers three concentrations in the context of a broad liberal arts program. The music industry concentration is the first such undergraduate program in Boston. It is designed for students with an interest in artist management, marketing and promotion, contracting and legal issues, the recording process, and studio techniques. Developed in collaboration with Northeastern's College of Business Administration, the music industry concentration leads to a Bachelor of Science degree.

The two other concentrations lead to Bachelor of Arts degrees. The music literature concentration has a historical orientation, while the program in music literature and performance combines history with hands-on music making. Students must audition for the music literature and performance program. This program may be especially useful for students working toward a Massachusetts teaching certification, which now requires a dual major in education and another liberal arts program.

Through an exchange program, students may attend classes at the New England Conservatory of Music. Students also share an array of high-tech and multimedia equipment.

While some music courses are designed for music majors, the department also offers elective survey courses. Several of these courses fulfill the College of Arts and Sciences core curriculum requirement.

An extensive concert series offers a variety of performances by students, faculty, and guest artists. Students also have the opportunity to participate in our active choral groups, bands, and chamber ensembles.

Bachelor of Arts Curriculum

Concentration in music literature. MUS 1107, Principles of Music Literature; MUS 1200, Fundamentals of Theory; MUS 1201, MUS 1202, MUS 1203, MUS 1204, Music Theory 1, 2, 3 and 4; MUS 1241, Piano 1; MUS 1301, MUS 1302, Form and Analysis 1 and 2; MUS 1171, Computer Literacy for Musicians; MUS 1420, Cultural Traditions; MUS 1421, MUS 1422, MUS 1423, and MUS 1424, Historical Traditions 1, 2, 3 and 4. Also take HST 1102, Western Civilization 2.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in music literature and performance. MUS 1107, Principles of Music Literature; MUS 1200, Fundamentals of Theory; MUS 1201, MUS 1202, MUS 1203, MUS 1204, Music Theory 1, 2, 3 and 4; MUS 1241, Piano 1; MUS 1301 and 1302, Form and Analysis 1 and 2; MUS 1461, Applied Music Lessons (taken six times); MUS 1171, Computer Literacy for Musicians; MUS 1420, Cultural Traditions; MUS 1421, MUS 1422, MUS 1423, and MUS 1424, Historical Traditions 1, 2, 3 and 4. Also take HST 1102, Western Civilization 2.

Students in both concentrations must participate in at least one Northeastern University performing ensemble during at least eight of their quarters on campus.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

Concentration in music industry. MUS 1107, Principles of Music Literature; MUS 1200, Fundamentals of Theory; MUS 1201, MUS 1202, MUS 1203, Music Theory 1, 2 and 3; MUS 1241, Piano 1; MUS 1171, Computer Literacy for Musicians; MUS 1420, Cultural Traditions; MUS 1421, MUS 1422, MUS 1423, and MUS 1424, Historical Traditions 1, 2, 3 and 4; MUS 1165 and MUS 1166, Music Industry 1 and 2; MUS 1365, Seminar in the Music Industry; and three of the following: MUS 1170, Music and Technology; MUS 1172, The Recording Studio; MUS 1173, The Recording Studio 2; MUS 1366, Copyright Law for the Musician.

ECN 1115, Principles of Macroeconomics; ECN 1116, Principles of Microeconomics. One of the following three pairs of courses in descriptive and inferential statistics: MTH 1387 and 1390; ECN 1250 and 1251; POL 1301 and 1302. MGT 1115, Introduction to Business; ACC 1111, Introduction to Accounting. Two of the following business courses: FIN 1438, Introduction to Finance; MKT 1435, Introduction to Marketing; HRM 1432, Organizational Behavior; MSC 1441, Operations Management; ENT 1330, Management of Smaller Enterprises. HST 1102, Western Civilization 2.

Students must participate in at least one Northeastern University performing ensemble during at least eight of their quarters on campus.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

General music track. MUS 1200, Fundamentals of Music; MUS 1201, Music Theory 1; MUS 1202, Music Theory 2; MUS 1241, Piano 1 *or* MUS 1209, Functional Piano; MUS 1100, Introduction to Music *or* MUS 1107, Principles of Music; and a music history course.

Music theatre track. MUS 1200, Fundamentals of Music; MUS 1201, Music Theory 1; MUS 1100, Introduction to Music; MUS 1211, Sightsinging; MUS 1244, Voice Class 1; INT 1110, American Musical Theatre *or* MUS 1132, Introduction to Opera; MUS 1100, Introduction to Music *or* MUS 1107, Principles of Music; and the following courses four times each: MUS 1261, Voice Lessons and MUS 1230, Chorus.

Music industry track. MUS 1200, Fundamentals of Music; MUS 1201, Music Theory 1; MUS 1165, Music Industry 1; MUS 1166, Music Industry 2; MUS 1241, Piano Class 1 *or* MUS 1209, Functional Piano; MUS 1100, Introduction to Music *or* MUS 1107, Principles of Music; MUS 1170, Music and Technology *or* MUS 1171, Computer Literacy for Musicians; and two approved music industry electives.

Philosophy and Religion

Susan M. Setta, PhD, *Associate Professor and Chair*

Professors

Walter L. Fogg, PhD
Pavel Kovaly, PhD, CSc
Stephen L. Nathanson, PhD

Associate Professors

William J. DeAngelis, PhD
Bart K. Gruzalski, PhD
Edward A. Hacker, PhD
Michael Lipton, PhD
Gordon E. Pruett, PhD

Lecturer

Michael C. Meyer, PhD

Philosophy addresses questions and theories related to art, religion, morality, society, and natural and social sciences. The study of philosophy challenges students to examine through critical reflection their beliefs in many areas.

Courses aim to provide students with an understanding of the methods and traditions of philosophical and religious thought. Through readings, discussion, and writing, students examine questions

concerning the nature and validity of religious beliefs, moral judgments, and scientific theories as well as questions about values and social policy in such areas as law, medicine, and technology.

Coursework in philosophy can strengthen the student's work in other areas. Philosophy majors enter diverse careers, ranging from college-level teaching to law. The program strives to help students sharpen their critical abilities, thereby enhancing their preparation for graduate or professional study.

Religion Program

The department's religion courses help students acquire an understanding of religious experience in both its individual and cultural expressions. Classes look at specific religions as well as at the mythical, mystical, and cultural dimensions of religious experience. Although the department does not offer a religion major, it does offer a solid introduction to religious studies through introductory and intermediate-level courses. Upper-level philosophy courses complement and support the religious studies courses.

Bachelor of Arts and Bachelor of Science Curriculum

PHL 1225, Ancient Philosophy; PHL 1230, History of Modern Philosophy *or* PHL 1200, Introduction to Logic 1 *or* PHL 1215, Symbolic Logic; PHL 1400, Theory of Knowledge *or* PHL 1405, Metaphysics *or* PHL 1335, Moral Philosophy; one philosophy seminar; and eight philosophy electives.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

PHL 1100, Introduction to Philosophy 1 *or* PHL 1105, Introduction to Scientific Method; PHL 1225, Ancient Philosophy *or* PHL 1230, History of Modern Philosophy; PHL 1200, Introduction to Logic 1 *or* PHL 1215, Symbolic Logic; one of the following: PHL 1142, Philosophy of Mind; PHL 1400, Theory of Knowledge; PHL 1405, Metaphysics; and PHL 1335, Moral Philosophy; and three philosophy electives

Physics

Paul M. Champion, PhD, *Professor and Chair*

Professors

Ronald Aaron, PhD
Petros N. Argyres, PhD
Arun Bansil, PhD
Alan H. Cromer, PhD
William L. Faissler, PhD
Marvin H. Friedman, PhD
David A. Garelick, PhD
Michael J. Glaubman, PhD
Haim Goldberg, PhD
Jorge V. José, PhD
Robert P. Lowndes, PhD
Bertram J. Malenka, PhD
Pran Nath, PhD
Clive H. Perry, PhD
Stephen Reucroft, PhD

Carl A. Shiffman, PhD
Jeffrey B. Sokoloff, PhD
Yogendra N. Srivastava, PhD
Michael T. Vaughn, PhD
Eberhard von Goeler, PhD
Allan Widom, PhD
Fa Yueh Wu, PhD

Associate Professors

George O. Alverson, PhD
Jacqueline Krim, PhD
Marie E. Machacek, PhD
Robert S. Markiewicz, PhD
Srinivas Sridhar, PhD

Assistant Professors

Alain S. Karma, PhD
Ian Leedom, PhD
Tomasz Taylor, PhD

Professors Emeriti

Eugene J. Saletan, PhD
Walter Hauser, PhD

Physics examines the fundamental principles that govern natural phenomena, ranging in scale from collisions of subatomic particles, through the behavior of solids, liquids, and biomolecules, to exploding stars and colliding galaxies.

The program aims to help students experience the intellectual stimulation of studying physics and astrophysics and the excitement of front-line research; understand the basic principles and techniques of physics-related careers; and prepare for graduate study in physics or related fields.

The department offers four levels of undergraduate courses: descriptive courses for non-science majors with limited mathematical background; general survey courses for students in scientific and engineering fields; advanced courses primarily intended for physics majors; and highly advanced courses primarily intended for prospective graduate students.

In addition to work in industrial, government, or high-technology laboratories in areas of applied physics, students may find opportunities in such fields as biophysics, computer science, geophysics, medical and radiation physics, and engineering. Many physics majors pursue advanced degrees in physics and related fields.

Bachelor of Arts Curriculum

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3, and associated labs PHY 1521, PHY 1522, PHY 1533; PHY 1301, Intermediate Mechanics; PHY 1302, Electric and Magnetic Fields; three upper-level physics lecture courses, and three upper-level lab courses.

MTH 1143, MTH 1144, MTH 1145, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus 4 and 5; and one advanced mathematics elective.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3, and associated labs PHY 1521, PHY 1522, PHY 1533; PHY 1301, Intermediate Mechanics; PHY 1302, Electric and Magnetic Fields; PHY 1303, Modern Physics; PHY 1304, Mathematical Physics; PHY 1305, Thermodynamics and Kinetic Theory; PHY 1401, Classical Mechanics; PHY 1402, PHY 1403, Electricity and Magnetism 1 and 2; PHY 1404, Wave Motion and Optics; and three upper-level lab courses.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus 4 and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2; and five additional electives from those approved for majors in the following fields: physics, mathematics, computer science, chemistry, engineering, biology, and geology.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science in Applied Physics Curriculum

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3, and associated labs; PHY 1521, PHY 1522, PHY 1533; PHY 1301, Intermediate Mechanics; PHY 1302, Electric and Magnetic Fields; PHY 1303, Modern Physics; PHY 1305, Thermodynamics and Kinetic Theory; PHY 1404, Wave Motion and Optics; PHY 1551 and PHY 1552, Electronics for Scientists 1 and 2; PHY 1555, Wave Lab; PHY 1557, Advanced Lab; and PHY 1561, Project Lab.

MTH 1140, MTH 1141, MTH 1142, Calculus 1, 2, and 3; MTH 1243, MTH 1244, Calculus 4 and 5; MTH 1245, MTH 1246, Differential Equations 1 and 2.

COM 1100, Fundamentals of Computer Science; COM 1101, Algorithms and Data Structures 1; and COM 1201, Data Structures 2. Four additional electives from those approved for majors in the following fields: physics, mathematics, chemistry, computer science, engineering, biology, and geology.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor in Physics Curriculum

PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3, and three upper-level lecture or lab courses from the following list: PHY 1301, PHY 1302, PHY 1303, PHY 1304, PHY 1305, PHY 1401, PHY 1402, PHY 1403, PHY 1404, PHY 1411, PHY 1412, PHY 1413, PHY 1414, PHY 1415, PHY 1416, PHY 1551, PHY 1552, and PHY 1555.

Minor in Instrumentation for Science Curriculum

The minor offers experience in the use of common laboratory instruments, the taking and analysis of data, and elementary skills in electronics. A primary goal of the minor is to prepare the student to design and construct relatively small-scale purpose measurement instrumentation.

Required courses: PHY 1221, PHY 1222, PHY 1223, Physics for Science and Engineering Students 1, 2, and 3; PHY 1555, Wave Laboratory; and PHY 1551, PHY 1552, Electronics for Scientists 1 and 2.

Political Science

Suzanne P. Ogden, PhD, *Professor and Chair*

Professors

Michael A. Baer, PhD
Robert L. Cord, PhD
Robert E. Gilbert, PhD
David E. Schmitt, PhD

Distinguished Visiting Professor

Michael S. Dukakis, JD

Associate Professors

Christopher J. Bosso, PhD
L. Gerald Bursey, PhD
Minton F. Goldman, PhD
Eileen L. McDonagh, PhD
William F. S. Miles, PhD
David A. Rochefort, PhD

Assistant Professors

Leslie E. Armijo, PhD
William D. Kay, PhD
Richard A. Loverd, PhD
William G. Mayer, PhD
John H. Portz, PhD
John F. Ross, PhD
Denis J. Sullivan, PhD
Michael C. Tolley, PhD
Bruce A. Wallin, PhD

Undergraduates majoring in political science study political behavior, power, policies, values, and institutions. Students gain an awareness of the environment that shapes policies and a sensitivity to multicultural, gender, and racial issues implicit in policies, institutions, and values.

The department has concentrations in law and legal issues and in public administration and offers a range of courses on international relations, comparative politics, American politics, political philosophy, and public administration.

Approximately half the majors participate in the cooperative education program, with placements in state and federal government agencies, law firms, nonprofit institutions, and corporations. Most students complete either a co-op position or an internship with a congressional representative, a senator, a governor, or other elected public servant.

Students may also participate in extracurricular programs designed to expand their leadership ability, such as the Model United Nations, the Model Arab League, the student government, or the

College Democrats or College Republicans. Many students study abroad in one of the college's international programs, such as the Irish Studies program, which includes an internship in the Irish Parliament. Qualified students may be selected for the honors program and join the activities of the political science honor society.

A major in political science helps prepare students for law school, graduate school, and careers in the government and the nonprofit sector, as well as for teaching, journalism, legislative or lobbying positions, public relations activities, and work in international corporations.

Bachelor of Arts Curriculum

POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments and Societies; POL 1261, Public Administration; one political theory/thought course selected from the following: POL 1373, POL 1374 or POL 1378; and seven political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in law and legal issues. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1261, Public Administration; POL 1373, Pre-Modern Political Thought *or* POL 1374, Modern Political Thought *or* POL 1378, Contemporary Political Thought; six law-related political science electives; and four general political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science Curriculum

POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments and Societies; POL 1261, Public Administration; POL 1301, POL 1302, Research Methods 1 and 2; and one political theory/thought course selected from the following: POL 1370, POL 1373, POL 1374 or POL 1378; and six political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in law and legal issues. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1261, Public Administration; POL 1301, POL 1302, Research Methods 1 and 2; POL 1373, Pre-Modern Political Thought *or* POL 1374, Modern Political Thought *or* POL 1378, Contemporary Political Thought; six law-related political science electives; and two general political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult the political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 31).

Concentration in public administration. POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1261, Public Administration; POL 1301, POL 1302, Research Methods 1 and 2; POL 1373, Pre-Modern Political Thought *or* POL 1374, Modern Political Thought *or* POL 1378, Contemporary Political Thought; six public administration electives; and two general political science electives.

Six social science electives selected from at least three of the following areas: African-American studies, anthropology, economics, history, psychology (consult political science department's approved psychology course list), and sociology.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

Any two of the following courses: POL 1110, Introduction to Politics; POL 1111, Introduction to American Government; POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments and Societies; POL 1261, Public Administration. Any five additional courses offered by the Department of Political Science for political science majors, including courses listed above that have not been selected to fulfill the above requirement.

Minor in International Politics Curriculum

POL 1112, Introduction to International Relations; POL 1113, Introduction to Foreign Governments and Societies; any five additional courses in international politics and/or comparative politics offered by the Department of Political Science.

Psychology

Leon J. Kamin, PhD, *Professor and Chair*

Professors

Norman Adler, PhD
Judith A. Hall, PhD
Stephen G. Harkins, PhD
Harlan L. Lane, PhD,
Doc. ès Lettres
Joanne L. Miller, PhD
Adam J. Reeves, PhD
Bertram Scharf, PhD
Alexander A. Skavenski, PhD
James R. Stellar, PhD
Harold S. Zamansky, PhD

Associate Professors

Edward A. Arees, PhD
Martin L. Block, PhD
Roger F. Brightbill, PhD
Perrin S. Cohen, PhD
Charles Karis, PhD
Harry A. McKay, PhD

Assistant Professors

David J. Bryant, PhD
Jane A. Bybee, PhD
Elizabeth Cole, PhD
C. Randall Colvin, PhD
Rhea T. Eskew, PhD
Frank Naarendorp, PhD
Nancy N. Soja, PhD
Shari R. Speer, PhD

Psychology is the study of human and animal behavior and the ways people think. An interdisciplinary science, psychology includes methods and knowledge derived from the other natural and social sciences.

The psychology curriculum explores such topics as how brain function determines behavior; how we see, hear, and learn; what constitutes abnormal personality; how people develop emotionally and cognitively; and how individuals work in groups. Through laboratory practice and experimentation, individual research projects, and small-group seminars, the program encourages critical evaluation of psychology's accomplishments and its future.

The Bachelor of Arts degree is intended for students who wish to pursue a broad liberal arts education that explores the humanities, the social sciences, and, to a lesser extent, the natural sciences. The Bachelor of Science degree is more specialized and is usually recommended for students who have a strong scientific interest in psychology and the natural sciences.

The psychology department offers honors sections of introductory psychology, as well as honors activities in other courses. All students are eligible for directed study courses, which are individualized study or research experiences under the supervision of a faculty member. Co-op placements are based in both community (often mental health) and laboratory settings.

A solid scientific background in psychology helps prepare students for careers in teaching, business, public service, or research and provides a foundation for graduate study in all areas of psychology, including clinical, as well as in law and medicine.

Bachelor of Arts and Bachelor of Science Curriculum

PSY 1110, Perspectives in Psychology 1 *or* PSY 1111, Foundations of Psychology 1; PSY 1112, Foundations of Psychology 2 *or* PSY 1113, Perspectives in Psychology 2; PSY 1211 and PSY 1212, Statistics in Behavioral Science 1 and 2. Students in PSY 1111 and PSY 1112 are normally required to participate as research subjects in experiments conducted by department faculty.

Two courses from the following: PSY 1271, Social Psychology; PSY 1272, Personality 1 *or* PSY 1373, Abnormal Psychology 1; and PSY 1241, Human Behavioral Development 1. Three courses from the following: PSY 1262, Psychology of Language *or* PSY 1364, Cognition; PSY 1231, Learning and Motivation; PSY 1351, Psychobiology; and PSY 1381, Sensation *or* PSY 1382, Perception.

Within the psychology department, students may concentrate their electives in a variety of subareas, including language and cognition; learning and motivation; personality and social psychology; sensory and psychobiology; or individual study. Students should see a department adviser regarding these concentrations.

Additional requirements for Bachelor of Arts: Four psychology electives; *either* three psychology labs *or* two psychology labs and one psychology directed study; one psychology seminar.

Additional requirements for Bachelor of Science: Seven psychology electives; *either* four psychology labs *or* three psychology labs and one psychology directed study; one psychology seminar. Four mathematics, science, or computer science courses beyond the core curriculum requirements. Also, one humanities course beyond the core curriculum requirements.

Students must also complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

PSY 1110, Perspectives in Psychology 1 *or* PSY 1111, Foundations of Psychology 1; PSY 1112, Foundations of Psychology 2 *or* PSY 1113, Perspectives in Psychology 2; and PSY 1211, PSY 1212, Statistics in Behavioral Science 1 and 2.

Two courses from the following: PSY 1271, Social Psychology; PSY 1272, Personality 1 *or* PSY 1373, Abnormal Psychology 1; PSY 1241, Human Behavioral Development 1; PSY 1262, Psychology of

Language or PSY 1364, Cognition; PSY 1231, Learning and Motivation; PSY 1351, Psychobiology; and PSY 1381, Sensation or PSY 1382, Perception.

Four psychology electives.

Sociology and Anthropology

Michael E. Brown, PhD, *Professor and Chair*

Professors

Arnold Arluke, PhD
Morris Freilich, PhD
Debra R. Kaufman, PhD
Alan M. Klein, PhD
Elliott A. Krause, PhD
Jack Levin, PhD
Ronald J. McAllister, PhD
Felix M. Padilla, PhD
Earl Rubington, PhD

Associate Professors

Richard Bourne, PhD
Winifred Breines, PhD
Christine Gailey, PhD
M. Patricia Golden, PhD
Wilfred E. Holton, PhD
Anthony T. Jones, PhD
Maureen Kelleher, PhD
Thomas H. Koenig, PhD
Carol A. Owen, PhD
Judith Perrolle, PhD
Thomas M. Shapiro, PhD
Lynn Stephen, PhD

Assistant Professors

Michael Blim, PhD
Daniel R. Faber, PhD
Luis M. Falcon, PhD
Gordana Rabrenovic, PhD

Professor Emeritus

Morton Rubin, PhD

Sociology and anthropology provide the critical perspective needed for studying the social arrangements in which people live, in particular for understanding how societies function, for studying the conditions under which people change society, and for describing the modes and conditions of cooperation that make social life possible.

Courses in the program examine such areas as gender, race, class, cities, conflict, law and crime, multiculturalism and intercultural relations, technology and the environment, education, media, and the comparative interdisciplinary analyses of societies. Many courses are directly relevant to majors in other fields, including economics, political science, philosophy, literature, criminal justice, and business.

A major in sociology or anthropology helps prepare students for careers in public or private service, including such fields as law, teaching, social work, administration or management, and research.

Bachelor of Arts in Sociology Curriculum

SOC 1100, Introduction to Sociology; SOA 1100, Peoples and Cultures; SOC 1320, Introduction to Statistical Analysis; SOC 1321, SOC 1322, Research Methods 1 and 2; SOC 1300, Classical Social Thought; SOC 1301, Current Social Thought; SOC 1310, Class, Power, and Social Change; two intermediate courses (1100 or 1200 level); two advanced courses (1300, 1400, or 1500 level); and one anthropology course beyond SOA 1100. Six electives in the social sciences other than sociology/anthropology.

In addition, complete the arts and sciences core curriculum (see page 31).

Bachelor of Science in Sociology Curriculum

SOC 1100, Introduction to Sociology; SOA 1100, Peoples and Cultures; SOC 1320, Introduction to Statistical Analysis; SOC 1321, SOC 1322, Research Methods 1 and 2; SOC 1300, Classical Social Thought; SOC 1301, Current Social Thought; SOC 1310, Class, Power, and Social Change; two intermediate courses (1100 or 1200 level); two advanced courses (1300, 1400, or 1500 level); and one anthropology course beyond SOA 1100. Six electives in the social sciences other than sociology/anthropology. Six additional electives.

In addition, complete the arts and sciences core curriculum (see page 31).

Minor in Sociology Curriculum

SOC 1100, Introduction to Sociology; any two courses from among the following: SOC 1321, Research Methods 1; SOC 1322, Research Methods 2; SOC 1300, Classical Social Thought; SOC 1301, Current Social Thought; any three-course specialization in sociology arranged between the student and adviser; and one additional 1300, 1400, or 1500 level course.

Bachelor of Arts in Anthropology Curriculum

SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOC 1100, Introduction to Sociology; and at least three of the following: SOA 1335, Language and Communication; SOA 1125, Stones and Bones: Prehistory in the New World; SOA 1155, Individual and Culture; SOA 1301, Human Origins; SOA 1160, Sex, Sex Roles, and Family; SOA 1425, Cultural Survival; SOA 1146, Rural Workers in the Third World; SOA 1310, Global Markets and Local Cultures; SOA 1470, Myth and Religion; at least six additional anthropology courses; and one sociology elective beyond SOC 1100. Six electives in the social sciences other than sociology/anthropology.

In addition, complete the arts and sciences core curriculum (see page 31).

**Bachelor of Science in
Anthropology Curriculum**

SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOC 1100, Introduction to Sociology; and at least three of the following: SOA 1335, Language and Communication; SOA 1125, Stones and Bones: Prehistory in the New World; SOA 1155, Individual and Culture; SOA 1301, Human Origins; SOA 1160, Sex, Sex Roles, and Family; SOA 1310, Global Markets and Local Cultures; SOA 1425, Cultural Survival; SOA 1146, Rural Workers in the Third World; SOA 1470, Myth and Religion; at least six additional anthropology courses; and one sociology elective beyond SOC 1100. Six electives in the social sciences other than sociology/anthropology. Four additional electives.

In addition, complete the arts and sciences core curriculum (see page 31).

**Minor in Anthropology
Curriculum**

SOA 1100, Peoples and Cultures; SOA 1104, Cultures of the World; SOA 1335, Language and Communication; SOA 1155, Individual and Culture; SOA 1160, Sex, Sex Roles, and Family; and any two-course specialization in anthropology arranged between the student and adviser.

Theatre

Del Lewis, MFA, *Associate Professor and Chair*

Professor

Mordecai S. Kaplan, MA

Associate Professors

Janet L. Bobcean, MFA

Jerrold A. Phillips, PhD

Assistant Professor

Nancy Kindelan, PhD

Clinical Lecturer

Theodore D. Janello, MA

The study of theatre—as performance, visual expression, text, theory, and history—explores the techniques of creatively imaging or re-imaging the experiences of society and of the individual.

The program at Northeastern balances production theory and practice. In the theatre production laboratory, students (majors and non-majors) are involved in experiential learning that synthesizes the ideas, theories, and practices studied in the classroom. All theatre majors participate in laboratory and public performances.

A theatre major may petition to enter one of three concentrations: performance, production, or generalist. Opportunities exist for independent projects, internships, and co-op experiences.

Theatre majors may pursue advanced study in graduate or professional programs, careers as theatre practitioners, or careers in theatre education.

**Bachelor of Arts and
Bachelor of Science
Curriculum**

THE 1100, Introduction to the Theatre Arts; THE 1106, THE 1107, Theatre History 1 and 2; THE 1112, Dramatic Theory/Criticism; THE 1114, Masters of Theatre; THE 1149, Script Analysis; THE 1150, Acting 1 (majors section); THE 1180, Concepts of Direction; THE 1200, Stagecraft; THE 1212, Introduction to Theatrical Design; THE 1300, Acting 2; and THE 1800, THE 1801, THE 1802, and THE 1803, Practicum in Production 1, 2, 3, and 4. All theatre majors must take ENG 1658, Introduction to Shakespeare, in the college core curriculum.

All theatre majors should select the following courses in their *freshman* year: THE 1100, Introduction to Theatre Arts (fall quarter); THE 1150, Acting 1 (majors section) (winter quarter); and THE 1200, Stagecraft (spring quarter).

After completing 32 quarter hours, theatre majors may choose to be theatre generalists or to concentrate in production or performance. Admission to a concentration is by petition or audition.

Theatre generalist. THE 1116, American Theatre or THE 1121, Contemporary Theatre; THE 1210, Scene Design 1; THE 1226, Lighting for the Stage; THE 1261, Costuming 1; THE 1505, Continental Drama; THE 1510, Twentieth Century Theatre; and four courses from the following group: THE 1140, Playwriting; THE 1160, Body Movement 1; THE 1280, Stage Makeup; THE 1284, Theatre Management; THE 1325, Musical Theatre Technique; or THE 1410, Technical Production.

Concentration in production. THE 1209, Theatrical Drafting; THE 1210, Scene Design 1; THE 1226, Lighting for the Stage; THE 1261, Costuming 1; THE 1284, Theatre Management; THE 1410, Technical Production; THE 1505, Continental Drama; THE 1510, Twentieth Century Theatre; and two courses from the following: THE 1213, Scene Design 2; THE 1225, Scene Painting; THE 1265, Pattern Drafting; THE 1280, Stage Makeup; THE 1400, Costuming 2; or THE 1430, Lighting 2. All production concentration majors must take electives ART 1101, Art History Since 1400 and ART 1124, Basic Drawing.

Concentration in performance. THE 1116, American Theatre or THE 1121, Contemporary Theatre; THE 1155, Voice for the Theatre; THE 1160, Body Movement 1; THE 1280, Stage Makeup; THE 1301, THE 1302, Acting 3 and 4; THE 1316, Acting for the Camera; THE 1325, Musical Theatre Technique; THE 1505, Continental Drama; and THE 1510, Twentieth Century Theatre. All performance concentration majors must take 4 quarter hours of dance/physical education electives (HSL).

All students must complete the arts and sciences core curriculum (see page 31).

Minor Curriculum

THE 1100, Introduction to Theatre Arts; THE 1106, THE 1107, Theatre History 1 and 2; THE 1150, Acting 1 (majors section); THE 1180, Concepts of Direction; THE 1200, Stagecraft; THE 1212, Introduction to Theatrical Design; and one of the following: THE 1149, Script Analysis; THE 1210, Scene Design 1; THE 1226, Lighting for the Stage; THE 1261, Costuming 1; and THE 1300, Acting 2. Laboratory practice in technical theatre and performance, including THE 1800 and THE 1801, Practicum in Production 1 and 2, is required.

Music majors who wish to minor in musical theatre must take the following courses. THE 1100, Introduction to Theatre Arts; THE 1111, American Musical Theatre; THE 1149, Script Analysis; THE 1150 and THE 1300, Acting 1 and 2; THE 1160, Movement 1; THE 1325, Musical Theatre Technique; THE 1800, THE 1801, THE 1802, and THE 1803, Practicum in Production 1, 2, 3, and 4. Laboratory practice in technical theatre and performance, in conjunction with the coursework, is required.

Bouvé College of Pharmacy and Health Sciences

James J. Gozzo, PhD, *Dean*

Mehdi Boroujerdi, PhD, *Associate Dean for Pharmacy*

Patrick F. Plunkett, EdD, *Associate Dean for Academic Affairs*

Ena Vasquez-Nuttal, EdD, *Acting Associate Dean and Director of the Graduate School*

Anne M. Ahern, MEd, *Director of the Office of Student Services*

Nancy P. Warner, MS, *Academic Counselor*

Carol M. Konis, *Assistant to the Dean*

Marsha Adams-Pinto, *Assistant to the Dean*

Barry Kass, MBA, *Director of Continuing Education and Development*

Cornelius B. O'Leary, MEd, *Director of Graduate Admissions*

The programs in Bouvé College of Pharmacy and Health Sciences combine cooperative education experiences with highly innovative academic curricula that are designed to meet the demand for well-educated pharmacists and allied health professionals. The college prepares students to become effective professional practitioners, enter graduate schools, and work in many areas responsible for the delivery of health care.

The college offers students a health-care education that features a curriculum of highly relevant and closely integrated basic courses in the physical, biological, behavioral, and administrative sciences; on-site involvement in clinical patient care; a cooperative education work program, including a pharmacy externship-internship period and clinical affiliations in physical therapy and other health professions; and a commitment to the search for and advancement of new and progressive concepts, ideas, and philosophies of education and professional practice.

Each of the programs offered by the college is accredited by the appropriate professional group. The college is a member of the American Association of Colleges of Pharmacy and the Association of Schools of Allied Health Professions.

Class Entrance Requirements

Listed below are the overall quality-point averages required for students to advance to the next rank and to graduate.

Sophomore	1.6
Middler	1.8
Junior	2.0
Senior	2.0
To graduate	2.0

In addition, all students are required to attain a grade of C– or better in professional courses (CPS, MLS, PAH [except PAH 1135], PCL, PCT, PHP, PMC, and TOX). A required course in which an F or W grade is received can be repeated only once. If a grade of D is not considered passing in a professional course, the course can be repeated only once.

Medical laboratory science special requirements. A grade of C– or better must be earned in each professional course (MLS) in the program. To enter professional courses in the sophomore year, you must obtain a minimum quality-point average of 2.0 in all science courses, including mathematics, chemistry, biology, and basic medical laboratory science. To enter professional courses in the middler year, you must have a minimum quality-point average of 2.0 and have earned a C– or better in all professional courses. To enter clinical studies in the junior and senior years, you must have a minimum quality-point average of 2.5 and have earned a C– or better in all professional courses.

To be eligible for graduation, a baccalaureate degree candidate must have completed the specified curriculum with a minimum quality-point average of 2.5 and have earned a C– or better in all professional courses.

Health information administration special requirements. You must maintain a grade of C– or better in professionally related courses, including anatomy and statistics. You may not fail more than one professional course. Before you may take a subsequent course, you must remove this failure with a grade of C– or better. You must have a 2.0 average before you can be admitted to the directed applied study (clinical) courses. Clinical admissions must be approved by the health information administration faculty.

Cardiopulmonary sciences special requirements. In addition to the general grade requirement of at least a C– in all professional courses (CPS), students are required to maintain a quality-point average of at least 2.0 in the following professionally related courses to enter quarter 6: BIO 1120, BIO 1140, CHM 1111, CHM 1122, MTH 1107, PAH 1202, PAH 1204, and PHY 1201.

Toxicology special requirements. A grade of C or better is required in each toxicology course. A cumulative quality-point average of 2.0 is required for graduation. Professional electives cannot be taken on a pass/fail basis. An average of 2.5 or better overall is required of all students transferring into the program.

Physical therapy special requirements. During the first two years, physical therapy students must achieve a grade of C or better in each of the prerequisite sciences as well as in each professional course; all deficiencies, if any, must be cleared before a student may progress into the mid-dler year. Beginning with quarter 6, students must achieve a grade of C or better in each professional course to progress to the next academic quarter. In addition, specific academic requirements govern performance in the physical therapy program and department.

Athletic training special requirements. A grade of C or better must be earned in each professional course in the program. A minimum quality point average of 2.0 is required for field experience.

Open Option Program

The Open Option Program is designed for students who are undecided about a profession but are interested in a career in health care. The program offers freshmen a core of courses designed to provide the basic scientific background for each of the professional programs in the college in addition to a one quarter-hour health careers seminar.

Satisfactory completion of all freshman-year courses, including the Open Option core curriculum, is necessary for admission to one of the professional programs of the college. The Open Option plan does not apply to the dental hygiene, pharmacy, and physical therapy programs.

Transfer Credit

The college may accept qualified transfer students who have successfully completed one or more years of preprofessional coursework in an accredited college or university. No student transferring from another college or university may receive a degree unless the last three quarters of academic work immediately preceding graduation have been completed at Northeastern.

Athletic Training

Chad A. Starkey, PhD, *Program Director*

Faculty listed under Physical Therapy

The five-year Bachelor of Science in education program is designed for students interested in careers as athletic trainers. Working under a physician’s supervision, athletic trainers are members of the sports medicine field who specialize in the prevention, treatment, and rehabilitation of athletic injuries.

The athletic trainer’s duties include advising on proper conditioning techniques to help reduce the chance of injury, assessing the severity of injuries that do occur, applying appropriate treatment to aid the healing process, and supervising post-injury rehabilitation programs. Athletic trainers work with secondary school, college, and professional athletic teams and may be employed in private clinics.

Students may petition for acceptance into the athletic training program after successfully completing their first year of academic study. To be accepted into the program, applicants must maintain at least a 2.0 quality-point average during their first year. Students must achieve a grade of C (2.0) or better in all professional courses and all basic science courses. In order to complete the athletic training program, students must complete a minimum of 1,000 hours’ work with athletic teams in approved settings.

The program is approved by the National Athletic Trainers Association. Students who graduate from the athletic training program are eligible to sit for the National Athletic Trainers Association Certification Examination. Upon passing the examination, an individual may apply for Massachusetts licensure as an athletic trainer.

Bachelor of Science Curriculum

Quarter 1	CHM 1111, General Chemistry 1; COM 1105, Computer Science and Its Applications; ENG 1110, Freshman English 1; and MTH 1106, Fundamentals of Mathematics.
Quarter 2	ATP 1000, Introduction to Athletic Training; BIO 1152, Integrated Human Anatomy and Physiology 1; CHM 1112, General Chemistry 2; and ENG 1111, Freshman English 2.
Quarter 3	BIO 1153, Integrated Human Anatomy and Physiology 2; PSY 1111, Foundations of Psychology 1; SOC 1100, Introduction to Sociology; and one elective.
Quarter 4	ATP 1100, Prevention and Care of Athletic Injuries; ATP 1101, Athletic Training Laboratory; BIO 1154, Integrated Human Anatomy and Physiology 3; PHY 1201, Physics for the Life Sciences 1; PHY 1501, Physics Lab; and one elective.

Quarter 5	ATP 1200, Clinical Athletic Training; PHY1202, Physics for the Life Sciences 2; PTH 1250, Functional Anatomy and Biomechanics 1; and one elective.
Quarter 6	ATP 1300, Advanced Athletic Training 1; CRS 1314, Introduction to Counseling; PSY 1112, Foundations of Psychology 2; and PTH 1300, Functional Anatomy and Biomechanics 2.
Quarter 7	ATP 1350, Advanced Athletic Training 2; ATP 1390, Athletic Training Practicum 1; PTH 1600, Neuroscience; Middler-Year Writing Requirement; and one elective.
Quarter 8	ATP 1400, Therapeutic Modalities; ATP 1490, Athletic Training Practicum 2; CPS 1612, Exercise Physiology; and HSL 1468, Overview of Disabilities.
Quarter 9	ATP 1500, Therapeutic Reconditioning; ATP 1590, Athletic Training 3; MTH 1150, Probability, Statistics and the Computer; HSL 1286, Nutrition; and one elective.
Quarter 10	ATP 1600, Organization and Administration of Athletic Training; ATP 1690, Athletic Training Practicum 4; PTH 1405, Research for Physical Therapists; and SOC 1195, Drugs in Society.
Quarter 11	ATP 1800, Senior Seminar; one health elective; and two general electives.

Cardiopulmonary Sciences

Mary E. Watson, EdD, RRT, *Associate Professor and Chair*

Associate Professors

Thomas A. Barnes, EdD, RRT

Marilyn A. Cairns, ScD

William J. Gillespie, EdD

Patrick F. Plunkett, EdD, RRT

Donald Schneider, PhD

The Bachelor of Science degree program in the Department of Cardiopulmonary Sciences offers a common core curriculum in arts and sciences and cardiopulmonary sciences, as well as an opportunity to concentrate in cardiovascular technology, exercise physiology, or respiratory therapy.

Seminar courses in the first and second year are designed to give students information about professional options within the field of cardiopulmonary sciences so that they may make informed decisions about their specialization.

Cardiovascular Technology

The program in cardiovascular technology helps prepare students to assist cardiologists in performing diagnostic and interventional cardiac catheterizations, cardiac electrophysiology studies, pacemaker implantations, research protocols, and noninvasive testing such as echocardiography and nuclear imaging.

Before these procedures, the cardiovascular technologist prepares the instrument table, the procedure site, and the patient for the physician while maintaining sterile techniques at all times; attaches instruments for obtaining hemodynamic measurements throughout the procedure; and supplies all desired catheters, wires, sheaths, balloons, and devices needed by the physician.

During the procedures, the cardiovascular technologist is usually responsible for operating monitoring equipment and obtaining vital measurements from the patient, performing calculations from data, and informing physicians of any abnormal measurements or any changes in pressures or electrocardiograms. The cardiovascular technologist must be able to adapt preparations and procedures to meet the requirements of the individual case while maintaining the flexibility to deal with different situations.

All students in the cardiovascular technology specialization study fundamentals of cardiovascular technology, advanced cardiovascular technology, imaging modalities, echocardiography, clinical seminars, and clinical practice courses.

Most cardiovascular technologists work in hospitals as part of the health-care team. Others pursue biomedical research positions in companies or health-care facilities. Graduates are eligible for the registry examination for cardiovascular technology given by the National Society for Cardiopulmonary Technology. Upon successful completion of the exam, an individual is designated a Registered Cardiovascular Technologist (RCVT).

Exercise Physiology

An exercise physiologist develops, implements, and coordinates exercise programs and administers exercise tests, usually under the supervision of a physician. A clinical exercise physiologist assesses the patient's status, prescribes appropriate exercise, and counsels and educates patients with cardiovascular, pulmonary, and/or metabolic diseases.

All students in the exercise physiology specialization take courses in exercise physiology, exercise testing, prescription and programming, clinical kinesiology, cardiopulmonary assessment, electrocardiography, organization and administration of rehabilitation programs, and practicum experiences

in exercise physiology. Students may then choose an emphasis in either experimental exercise physiology or noninvasive cardiovascular technology. Students concentrating in experimental exercise physiology take courses in organic chemistry and biochemistry, physics, and calculus. Students who focus on noninvasive cardiovascular technology take courses in echocardiography and imaging modalities and complete a cardiovascular technology practicum.

Exercise physiology is an emerging and expanding profession within the health services industry. Exercise physiologists are employed in hospitals and outpatient clinics or in corporate and commercial centers in health promotion, wellness, fitness, and rehabilitation programs.

The American College of Sports Medicine has developed certification programs for professionals in the clinical areas of cardiovascular and pulmonary rehabilitation and in the health and fitness field. Graduates from the exercise physiology program are eligible to sit for either the exercise specialist or exercise test technologist certifications in the clinical area or the health fitness instructor certification in the health and fitness field.

Respiratory Therapy

Respiratory therapy is instrumental in the diagnosis, treatment, management, and preventive care of patients with cardiopulmonary problems. Patients suffering from a variety of acute or chronic disabling conditions may be found in newborn nurseries, surgical and medical units, emergency rooms, outpatient departments, and intensive care units.

Respiratory therapists are involved in treating disorders such as cardiac failure, asthma, pulmonary edema, emphysema, cerebral thrombosis, drowning, hemorrhage, and shock. The respiratory therapist is a life-support specialist trained in airway management, artificial ventilation, external cardiac massage, and other sophisticated emergency support measures.

Working under physicians' orders, respiratory therapists carry out specific therapeutic measures. They must provide and recommend specialized care and be skilled in such areas as medical gas administration; humidification, aerosols, and intermittent positive pressure breathing (IPPB); chest physiotherapy; cardiopulmonary resuscitation; mechanical ventilation; airway management; pulmonary function studies; blood gas analysis; and physiologic monitoring.

All students in the respiratory therapy specialization take several respiratory therapy didactic, laboratory, seminar and clinical practice courses.

After successful completion of the program, students are eligible to take the respiratory therapy registry examination administered by the National Board for Respiratory Care. Those who pass the exam earn the classification Registered Respiratory Therapist (RRT). The program is accredited by the Committee on Allied Health Education and Accreditation of the American Medical Association.

Bachelor of Science in Cardiopulmonary Science Curriculum

Quarter 1	CHM 1111, General Chemistry 1; COM 1105, Computer Science and Its Applications, CPS 1111, Cardiopulmonary Sciences Seminar 1; ENG 1110, Freshman English 1; and PSY 1111, Foundations of Psychology.
Quarter 2	BIO 1140, Animal Biology 1; CHM 1112, General Chemistry 2A or CHM 1122, General Chemistry 2B; CPS 1112, Cardiopulmonary Sciences Seminar 2; HSL 1282, Wellness; and SOC 1100, Introduction to Sociology.
Quarter 3	BIO 1120, Microbiology; CPS 1114, Basic Life Support; ENG 1111, Freshman English 2; MTH 1107, Functions and Basic Calculus; and one arts and sciences elective.
Quarter 4	PAH 1202, Anatomy & Physiology 1; PHY 1201, Physics for the Life Sciences 1; PHY 1501, Physics Lab; one humanities elective; and one open elective.
Quarter 5	CPS 1113, Cardiopulmonary Sciences Seminar 3; MTH 1150, Probability, Statistics, and the Computer; PAH 1204, Anatomy & Physiology 2; PHL 1165, Moral Problems in Medicine; and one humanities elective.

Cardiovascular Technology Curriculum

Additional Courses: Cardiopulmonary Physiology; Pathophysiology; Physics for Life Sciences; Nutrition; Cardiopulmonary Disease; Writing for the Health Professions; Exercise Physiology 1; Research Design; Counseling and Teaching; Pharmacology; Electrocardiography; Cardiopulmonary Assessment; Fundamentals of Cardiovascular Technology; Clinical Seminars; Medical Monitoring; Advanced Cardiovascular Technology; Cardiovascular Technology Practicum 1 and 2; Imaging Modalities; Echocardiography; Advanced Cardiac Life Support; and arts and sciences electives.

Exercise Physiology Curriculum

Additional Courses: Cardiopulmonary Physiology; Clinical Kinesiology; Pathophysiology; Physics for the Life Sciences; Nutrition; Cardiopulmonary Disease; Writing for the Health Professions; Exercise Prescription and Program; Exercise Physiology 1, Research Design; Counseling and Teaching; Cardiopulmonary Assessment; Electrocardiography; Pharmacology; Clinical Practicum 1, 2 and 3; Medical Monitoring; Exercise Physiology; Clinical Seminars; Administrative Rehabilitation Programs; Advanced Cardiac Life Support; and electives.

Respiratory Therapy Curriculum

Additional Courses: Cardiopulmonary Physiology; Pathophysiology; Physics for the Life Sciences; Nutrition; Cardiopulmonary Disease; Writing for the Health Professions; Exercise Physiology 1; Research Design; Counseling and Teaching; Introduction to Respiratory Care; Professional Practice Laboratories; Pharmacology; Cardiopulmonary Assessment; Electrocardiography; Practicum in Respiratory Care 1, 2, 3 and 4; Medical Monitoring, Respiratory Care for the Medical and Surgical Patient; Advanced Cardiac Life Support; and electives.

Dental Hygiene

The Forsyth School of Dental Hygiene conducts a program of dental hygiene education in cooperation with Northeastern University. Students attend classes at both the Forsyth Dental Center and Northeastern. Under the supervision of a dentist, the licensed dental hygienist renders preventive services to a patient. These services include administering dental prophylactic treatment, preparing dental radiographs, and teaching prescribed methods for maintaining dental health.

Graduates receive the Certificate in Dental Hygiene from the Forsyth School and the Associate in Science or Bachelor of Science in dental hygiene from Northeastern University. Graduates must satisfy the state dental hygiene licensure requirements before they may practice.

These programs are accredited by the Commission on Dental Accreditation of the American Dental Association, an accrediting body approved by the Department of Education and the Council on Post Secondary Accreditation.

Application should be made directly to the Forsyth School of Dental Hygiene, Office of Admissions, 140 The Fenway, Boston, MA 02115. For an application and a copy of the college catalogue, write that office or call 617-262-5200.

Bachelor of Science Curriculum

Quarter 1	BIO 1115, Human Biology; ENG 1110, Freshman English 1; MTH 1106, Fundamentals of Mathematics; PSY 1111, Foundations of Psychology 1; and one professional course.
Quarter 2	CHM 1111, General Chemistry; PAH 1135, Professional Dynamics in Health Care Delivery; one professional course; and one elective.
Quarter 3	BIO 1120, Basic Microbiology; CHM 1112, General Chemistry 2A; ENG 1111, Freshman English 2; SOC 1100, Introduction to Sociology; and one professional course.
Quarter 4	BIO 1150, Human Anatomy and Physiology 1; professional courses; and one elective.
Quarter 5	BIO 1151, Human Anatomy and Physiology 2; professional courses; and one elective.
Quarter 6	PHP 1303, Interpersonal Skills for Health Professionals and professional courses.
Quarter 7	MTH 1152, Statistical Thinking and professional courses.
Quarter 8	Professional courses and one elective.
Quarter 9	Professional courses and one elective.
Quarter 10	ENG 1125, Technical Writing 1; professional courses; and one professional elective.
Quarter 11	Professional courses; one professional elective; and one elective.
Quarter 12	Professional courses; one professional elective; and one elective.

Associate in Science Curriculum

Quarter 1	BIO 1150, Human Anatomy and Physiology 1 and professional courses.
Quarter 2	BIO 1151, Human Anatomy and Physiology 2 and professional courses.
Quarter 3	BIO 1120, Basic Microbiology and professional courses.
Quarter 4	ENG 1110, Freshman English 1 and professional courses.
Quarter 5	PSY 1111, Foundations of Psychology 1 and professional courses.
Quarter 6	ENG 1111, Freshman English 2; SOC 1110, Introduction to Sociology; and professional courses.

Health Information Administration

The Health Information Administration Program, formerly offered through the full-time day undergraduate college, will be offered through our evening division, University College. The program will be offered as an accelerated or part-time program. For further information, call 617-373-2818.

Medical Laboratory Science

Edward W. Schroder, M (ASCP), PhD, *Associate Professor and Chair*

Clinical Coordinator

Barbara E. Martin, MT (ASCP), CLS (NCA), MHP, *Program Director for Accredited Programs*

Laboratory Coordinator

Judith Baronas, MT (ASCP), BS

Professor

James J. Gozzo, PhD

Associate Professors

Judith T. Barr, CLS (NCA), ScD
Britta L. Karlsson, MT (ASCP), MS

Assistant Professor

Panayiota Araszkievicz, PhD

The Department of Medical Laboratory Science prepares professionals in the laboratory disciplines of clinical chemistry, hematology, immunohematology, immunology, and microbiology. Medical laboratory scientists (medical technologists) perform diagnostic test procedures using state-of-the-art computerized analyzers. They are responsible for overseeing patient specimen collection, and for test accuracy, cost-effectiveness, and efficiency in reporting results to physicians. Physicians rely on laboratory tests to establish a diagnosis and to determine therapy. Traditionally the program has prepared students for positions in health-care delivery, but, through cooperative education experiences, it also offers students the opportunity to explore positions in biological research, the biotechnology industry, and governmental agencies. Many graduates enter responsible positions in these areas. The curriculum also provides excellent preparation for advanced studies in graduate and professional schools.

The five-year program leads to a Bachelor of Science degree. Students begin the experiential learning phase of the program during their sophomore year, with cooperative education placements in regional institutions. Upper class students have the opportunity for international placements. Recently students have had co-ops in Sweden and England. In their junior and senior years students receive formal clinical training at some of metropolitan Boston's finest health-care facilities. To enter clinical training students must complete all prerequisite courses and maintain an acceptable quality-point average. Graduates of the Bachelor of Science program are eligible for national certification examinations as medical technologists and clinical laboratory scientists. Some states require additional licensure examinations.

The department also offers a three-year Associate in Science program that culminates in eligibility for national certification examinations at the level of medical or clinical laboratory technician. Students may use this option to enter the medical laboratory profession. Qualified students may apply associate degree coursework toward subsequent studies for the baccalaureate degree.

Bachelor of Science Curriculum

Quarter 1	BIO 1106, General Biology; CHM 1111, General Chemistry 1; ENG 1110, Freshman English 1; MLS 1101, MLS Orientation 1; MTH 1106, Fundamentals of Mathematics or MTH 1107, Functions and Basic Calculus.
Quarter 2	BIO 1107, Animal Biology; MLS 1102, MLS Orientation 2; MLS 1112, Renal Physiology and Urinalysis; MLS 1212, Urinalysis Lab; PAH 1135, Professional Dynamics in Health Care Delivery; and one elective.
Quarter 3	CHM 1122, General Chemistry 2; ENG 1111, Freshman English 2; MLS 1123 Hematology 1; MLS 1223, Hematology 1 Lab; MLS 1172, Basic Immunology; and one computer elective.
Quarter 4	CHM 1264, Organic Chemistry 1; MLS 1124, Basic Hematology 2; MLS 1224, Basic Hematology Lab; MLS 1142, Basic Microbiology 1; MLS 1242, Basic Microbiology 1 Lab; PAH 1210, Anatomy and Physiology; and one optional elective.
Quarter 5	CHM 1265, Organic Chemistry 2; MLS 1132, Immunohematology; MLS 1232, Immunohematology Lab; MLS 1144, Basic Clinical Microbiology 2; MLS 1244, Basic Clinical Microbiology 2 Lab; PAH 1212, Anatomy and Physiology; and one elective.
Quarter 6	BIO 1260, Genetics and Developmental Biology; MLS 1152, Clinical Chemistry; MLS 1252, Clinical Chemistry Lab; MLS 1621, Advanced Hematology; MLS 1623, Special Topics: Hemostasis; PHY 1201, Physics 1; and PHY 1501, Physics 1 Lab.
Quarter 7	BIO 1261, Cell Physiology and Biochemistry; ENG 1340, Writing Workshop; MLS 1654, Advanced Clinical Chemistry 1; PHY 1202, Physics 2; PHY 1502, Physics 2 Lab; and a statistics courses.

Quarter 8	MLS 1631, Advanced Immunohematology; MLS 1648, Advanced Clinical Microbiology; MLS 1655, Advanced Clinical Chemistry 2; MLS 1672, Immunopathology; and one elective.
Quarter 9	MLS 1532, Immunohematology MT Applied Study; MLS 1552, Clinical Chemistry MT Applied Study; and MLS 1573, Clinical Immunology MT Applied Study 1.
Quarter 10	MLS 1523, Hematology MT Applied Study; MLS 1544, Clinical Microbiology MT Applied Study; MLS 1574, Clinical Immunology MT Applied Study 2; and MLS 1890, Undergraduate Research (optional).
Quarter 11	HRA 1580, Training and Development; MLS 1662, Clinimetrics; MLS 1665, Medical Laboratory Management; MLS 1681, Senior Seminar; and two electives.

Minor Curriculum

This minor provides students majoring in other science fields an opportunity to explore the principles of the biological and chemical sciences as applied in the medical laboratory. Students may specialize in one of the five categorical areas of MLS: clinical chemistry, hematology, immunology, immunohematology, or microbiology. Four to five MLS courses are required for each minor. Upon completing the categorical minor, the student will be eligible for categorical national certification examination. Interested students must contact the MLS minor adviser in 206 Mugar to select appropriate courses. Prerequisites: General Chemistry 1 and General Biology for all except students specializing in clinical chemistry.

Pharmacy

Department of Pharmaceutical Sciences

Robert N. Hanson, PhD, *Professor and Acting Chair*

Professor

Mehdi Boroujerdi, PhD
Richard C. Deth, PhD
Roger W. Giese, PhD
James J. Gozzo, PhD
Ban An Khaw, PhD

Associate Professors

Norman R. Boisse, PhD
Ralph H. Loring, PhD
Robert A. Schatz, PhD
Barbara L. Waszczak, PhD

Assistant Professors

Mansoor Amiji, PhD
Jonathan Freedman, PhD
George C. Hwang, PhD
Gerald S. Jones, PhD
Eric J. Mack, PhD

Department of Pharmacy Practice

Mehdi Boroujerdi, PhD, *Professor and Interim Chair*

Professor

Gerald E. Schumacher,
PharmD, PhD

Associate Professors

Robert J. Cersosimo, PharmD
Gerald R. Donehew, PhD
Samuel J. Matthews, PharmD

Assistant Professor

Raafat A. Seifeldin, PharmD, PhD

Clinical Assistant Professor

Todd A. Brown, BS

Pharmacists prepare and dispense the drugs prescribed by physicians. Hospital and clinical pharmacy and institutional practice have attracted many practitioners and represent the fastest-growing areas of the profession. The increased use of the pharmacist as a drug consultant to medical and nursing staffs has broadened the scope of professional opportunity and given practitioners greater involvement as part of the health-care team.

Pharmacy also offers careers in research, manufacturing, government, law enforcement, and education. Many graduates of the pharmacy program go on to leading graduate and professional schools.

The college offers a five-year curriculum leading to the Bachelor of Science in pharmacy degree. The curriculum offers a blend of academic classroom and cooperative education experiences. The undergraduate pharmacy program subscribes to the standards established by the American Council on Pharmaceutical Education and the American Association of Colleges of Pharmacy.

Candidates for the Bachelor of Science in pharmacy degree must complete all prescribed courses—a minimum of 227 quarter hours. Students must maintain an overall quality-point average of C (2.0) and a C average in required pharmacy courses. They must meet the requirements of the Department of Cooperative Education to be eligible for the degree.

Pharmacists must meet certain requirements to obtain a license from the state in which they want to practice. These requirements ordinarily include graduating from an accredited college of pharmacy, passing an examination given by a state board of pharmacy, and completing an internship or apprenticeship.

The internship is a period of supervised practical experience in a preceptor pharmacy. This requirement is generally satisfied during the cooperative education periods, which commence during the student's second academic year. Students may apply up to 400 hours of the required academic clinical clerkship experience to their internship requirements. In addition, a college-directed externship adds to the total practice-oriented portion of the curriculum.

Pharmacy requires a significant amount of patient contact. Counseling by the pharmacist is considered essential to the effective and safe use of medications. Community pharmacy offers the opportunity to combine specialized pharmaceutical training with skills in management, business administration, and marketing. In addition to the patient contact and counseling, community pharmacists also spend considerable time discussing health-related matters with the prescribing physicians. Hospital and clinical pharmacists have the opportunity to apply clinical skills on a day-to-day basis; they may accompany other health-care professionals on ward rounds and consult with physicians on individual therapeutic regimens. Opportunities are expanding for pharmacists elsewhere. Health maintenance organizations (HMOs) and private groups, nursing homes and retirement complexes, the Public Health Service, health facilities, the armed services, and law enforcement agencies such as the Federal Drug Enforcement Administration all require pharmacists. Other graduates find employment in drug production or marketing with pharmaceutical industries, colleges of pharmacy, or in journalism. A growing number of pharmacy graduates seek additional professional training in pharmaceutical sciences, medicine, dentistry, or law.

Bachelor of Science Curriculum

Quarter 1	BIO 1106, General Biology; CHM 1111, General Chemistry 1; MTH 1106, Fundamentals of Mathematics <i>or</i> MTH 1107, Functions and Basic Calculus; PHP 1100, The Profession of Pharmacy; and one arts and sciences elective.
Quarter 2	BIO 1107, Animal Biology; ENG 1110, Freshman English 1; MTH 1107, Functions and Basic Calculus <i>or</i> MTH 1108, Calculus; and PAH 1135, Professional Dynamics in Health Care Delivery.
Quarter 3	CHM 1122, General Chemistry 2B; ENG 1111, Freshman English 2; MTH 1108, Calculus <i>or</i> an open elective; and one arts and sciences elective.
Quarter 4 (Entire class) (Sept.–Dec.)	CHM 1268, Organic Chemistry 1; PCT 1240, Pharmaceutical Calculations <i>or</i> PAH 1202, Anatomy and Physiology 1; PHY 1201, Physics 1; and one arts and sciences elective.
Quarter 4A (Entire class) (Jan.–March)	CHM 1269, Organic Chemistry 2; PAH 1202, Anatomy and Physiology 1 <i>or</i> PCT 1240, Pharmaceutical Calculations; PHY 1203, Physics 3; and one arts and sciences elective.
Quarter 5 (April–June and June–Sept.)	COM 1105, Computer Science and Its Applications; ENG 1340, Writing Workshop; PAH 1204, Anatomy and Physiology 2; PAH 1280, Biochemistry; and PHP 1303, Interpersonal Skills for Health Professionals.
Quarter 6	PCT 1310, Pharmaceutics Lab 1; PCT 1340, Pharmaceutics 1; PHP 1411, Pathophysiology; PMC 1322, Pharmaceutical Biotechnology; and PMC 1419, Pharmacology/Medicinal Chemistry 1.
Quarter 7	BIO 1121, Microbiology; PCL 1420, Pharmacology/Medicinal Chemistry 2; PCL 1451, Pharmacology Lab; PCT 1320, Pharmaceutics Lab 2; and PCT 1350, Pharmaceutics 2.
Quarter 8	PCL 1422, Pharmacology/Medicinal Chemistry 3; PCT 1440, Biopharmaceutics/Pharmacokinetics; PHP 1301, Pharmaceutical Jurisprudence; and PMC 1421, Antiinfectives.
Quarter 9 (Entire Class) (April–June)	PHP 1401, Drug Information and Evaluation; PHP 1441, Therapeutic Drug Monitoring; PHP 1601, Nonprescription Medication; and PHP 1609, Pharmacotherapeutics.
Quarter 10 (Summer/ Winter)	PHP 1302, Pharmacy Administration 1; PHP 1304, Social Pharmacology; PHP 1402, Parapharmaceuticals; PHP 1503, Professional Practice Lab; one professional elective; and one arts and sciences elective.
Quarter 10A (Fall/Spring)	PHP 1305, Hospital Pharmacy Management <i>or</i> PHP 1306, Community Pharmacy Management; TOX 1300, Clinical Toxicology; one professional elective; and one arts and sciences elective.
Quarter 11	PHP 1501, Community Pharmacy Externship.
Quarter 12	PHP 1505, Hospital Externship and PHP 1506, Clinical Clerkship.

Physical Therapy

David A. Lake, PhD, *Associate Professor and Chair*

Associate Professors

Janice S. Bruckner, PhD
Meredith H. Harris, EdD
Robert Sikes, PhD

Assistant Professors

Mary D. Slavin, PhD
Chad A. Starkey, PhD,
Program Director,
Athletic Training
Makoto Tsuchiya, MS

Clinical Supervisors

Clinical Instructors
Cindy I. Buchanan, MS
Ann L. Charrette, MA
Marguerite Geer, MA
Lisa M. Giallonardo, MS
Pauline Hamel, MEd
Mary O'Brien, MPH
Nancy L. Seaver, MPT

The physical therapy program prepares its graduates to provide quality patient care in a time of changing concepts, trends, and challenges. Students learn to help clients gain functional independence and to recognize and manage the emotional and socioeconomic problems that affect recovery.

Physical therapists evaluate the condition of the patient, plan and execute treatment programs developed to meet the patient's treatment goals, and periodically reassess those treatment goals. In addition, they develop injury-prevention and health-promotion activities and are trained to integrate their treatment plans into the total care plan for the patient. Additional responsibilities may include health-care planning and community service.

The physical therapy program is one of the few programs that accepts students directly. Students are physical therapy majors on their first day of classes, and there are no additional admission steps at any point. To continue in the program, students must maintain acceptable standards of scholarship and academic performance (as outlined in the student handbook) and must develop appropriate motor skills, professional behavior, and emotional maturity.

The department's five-year Bachelor of Science program stresses clinical problem solving. In the classroom students develop problem-solving skills, manual dexterity, and proficiency in technique and equipment. Cooperative education experiences give students a chance to apply knowledge gained in the classroom to clinical practice and to become members of the health-care community early in their studies.

In addition to cooperative education, the program includes periods of clinical experience, called affiliations, during which the student performs all duties of the physical therapist under the supervision of a licensed physical therapist.

Cooperative education placements and affiliations are available in a wide range of specialties and are located at sites throughout the country.

The curriculum in physical therapy is accredited by the Commission on Accreditation in Physical Therapy Education of the American Physical Therapy Association.

Physical therapists are employed in private practices; general, children's, and university hospitals; rehabilitation centers; schools or centers for disabled children; extended-care facilities; freestanding outpatient clinics; home-health agencies; and community, state, and federal agencies. They may also become involved in teaching and research.

Graduation Requirements

Students admitted to the Department of Physical Therapy must maintain acceptable standards of scholarship and performance in the prescribed program; demonstrate good health, verbal fluency, essential motor skills, professional behavior, and emotional maturity; complete all required courses; and have favorable evaluations from clinical education and co-op experience. Students must maintain a grade of C (2.0) or better in all professional courses and all basic science prerequisite courses listed in the academic policy statement of the Department of Physical Therapy. Students may not continue in the program upon earning a grade lower than C in three different science and/or professional courses. An earned grade lower than C for the second time in the same science and/or professional course precludes continuation in the program. These requirements include the professional courses Supervised Clinical Education 1 and 2. Students are expected to adhere to all terms of the department's policy statement. For information on departmental academic policies and procedures, contact the Department of Physical Therapy.

Transfer Students

Transfer students are admitted to the freshman and sophomore years of the physical therapy program based upon academic achievement and the availability of space in a particular graduating class. Consideration will be given to those transfer applicants who have achieved a minimum quality-point average of 3.3 on a four-point scale.

Bachelor of Science Curriculum

Quarter 1	CHM 1111, General Chemistry 1; MTH 1106, Fundamentals of Mathematics; PSY 1111, Foundation of Psychology 1; PHT 1007, Cooperative Education in Physical Therapy; and electives.
Quarter 2	BIO 1152, Integrated Human Anatomy and Physiology 1; CHM 1112, General Chemistry 2A; ENG 1110, Freshman English 1; PTH 1107, Cooperative Education in Physical Therapy; and electives.

Quarter 3	BIO 1153, Integrated Human Anatomy and Physiology 2; ENG 1111, Freshman English 2; MTH 1107, Functions and Basic Calculus; PTH 1114, Introduction to Physical Therapy; and electives.
Quarter 4	BIO 1154, Integrated Human Anatomy and Physiology 3; PHY 1201, Physics 1; PHY 1501, Physics 1 Lab; PTH 1118, Development Base of Human Performance; and electives. (PTH 1114, Introduction to Physical Therapy; for transfers only.)
Quarter 5	PHY 1202, Physics 2; PSY 1112, Foundation of Psychology 2; PTH 1202, Therapeutic Modalities in Physical Therapy Practice; CPS 1612, Exercise Physiology; and two electives.
Quarter 6	PTH 1310, Clinical Gross Anatomy; PTH 1316, Neuromuscular Physiology; PTH 1320, Soft Tissue Mobilization; and PTH 1325, Clinical Medicine 1.
Quarter 7	ENG 1340, Writing Workshop; PTH 1330, Clinical Kinesiology; PTH 1335, Musculoskeletal Evaluation; PTH 1341, Musculoskeletal Therapeutic Exercise; PTH 1345, Clinical Medicine 2; and PTH 1352, Psychosocial Aspects of Illness.
Quarter 8	PTH 1356, Prosthetics; PTH 1360, Neurological Therapeutic Exercise; PTH 1361, Neurological Assessment and Adult Neurology; PTH 1366, Neuroanatomy; and PTH 1370, Clinical Seminar.
Quarter 9	PTH 1380, Supervised Clinical Education 1; PTH 1386, Pediatric Neurology; PTH 1391, Cardiopulmonary Rehabilitation in Physical Therapy; PTH 1392, Pathophysiology and Clinical Therapeutics; and PTH 1396, Pediatric Evaluation and Treatment.
Quarter 10	PTH 1426, Functional Assessment of the Elderly Client; PTH 1453, Advanced Muscular Assessment and Treatment; PTH 1405, Research for Physical Therapy; PTH 1411, Clinical Integration; and one elective. Alternate: PTH 1415, Supervised Clinical Education 2.
Quarter 11	Alternate not taken in Quarter 10.
Quarter 12	PTH 1420, Physical Therapy in the Health Care System; PTH 1400, Administration; and two electives.

Toxicology

Robert A. Schatz, PhD, *Associate Professor and Director*

Toxicology examines the adverse effects of chemicals on biologic systems, the conditions under which those effects occur, and the relevant socioeconomic conditions and legal ramifications. The program offers a five-year Bachelor of Science degree that prepares students for work in a variety of specialties.

Forensic toxicology is a hybrid of analytical chemistry and fundamental toxicological principles that focuses on the medical and legal aspects of the harmful effects of chemicals. Biomedical toxicologists are concerned with intoxication by drugs and other chemicals. They are also involved in demonstrating the safety or danger of a drug prior to its release on the market.

Industrial or environmental toxicologists specialize in recognizing, identifying, and quantitating the relative hazards from occupational or public exposure to toxicants. Toxicologists who practice this specialty play a vital role in ensuring the safety of those in the work force or the general public who come into contact with industrial and commercial products.

Numerous federal and local laws aimed at protecting the environment, safeguarding employees in their workplaces, and protecting consumers against hazardous household products have created a critical demand for toxicologists. Job opportunities exist in government, industry, and environmental firms. Many graduates pursue advanced studies.

Bachelor of Science Curriculum

Quarter 1	BIO 1106, General Biology 1; ENG 1110, English 1; MTH 1107, Functions and Basic Calculus; TOX 1100, Toxicology Orientation; and one arts and sciences elective.
Quarter 2	CHM 1111, General Chemistry 1; ENG 1111, Freshman English 2; PHY 1201, Physics 1; and one arts and sciences elective.
Quarter 3	BIO 1107, Animal Biology 2; CHM 1122, Chemistry 2B; MTH 1108, Calculus; and one arts and sciences elective.
Quarter 4	CHM 1264, Organic Chemistry 1; PAH 1202, Anatomy and Physiology 1; PHY 1203, Physics 3; and TOX 1101, Current Topics in Toxicology.
Quarter 5	CHM 1265, Organic Chemistry 2; PAH 1204, Anatomy and Physiology 2; PSY 1211, Statistics in Behavioral Science; and one arts and sciences elective.

Quarter 6	PAH 1280, Biochemistry; PMC 1322, Pharmaceutical Biotechnology; PMC 1419, Medicinal Chemistry/Pharmacology 1; and one arts and sciences elective.
Quarter 7	ENG 1340, Writing Workshop; PCL 1420, Pharmacology/Medicinal Chemistry 2; PCL 1451, Pharmacology Lab; TOX 3121, Environmental Toxicology; and one arts and sciences elective.
Quarter 8	PCL 1422, Pharmacology/Medicinal Chemistry 3; MHP 3200, Risk Assessment; TOX 1301, Fundamental Principles of Systemic Toxicology <i>or</i> professional elective.
Quarter 9	BIO 1120, Basic Microbiology; BIO 1261, Cell Physiology and Biochemistry; TOX 1300, Clinical Toxicology; TOX 1803, Special Topics <i>or</i> one professional elective.
Quarter 10	CHM 1431, Instrumental Analysis <i>or</i> CHM 1461, Identification of Organic Compounds; TOX 1322, Biochemical Toxicology Laboratory; TOX 1801, Special Topics; and one open elective.
Quarter 11	HSL 1506, Community Health; MLS 1341, Epidemiology; TOX 1302, Chemical and Analytical Toxicology; and one or two arts and sciences electives.

Post-baccalaureate Certificate Programs

Cardiovascular Technology

A nine-month program in cardiovascular technology is available for professionals with a baccalaureate or master's degree who are interested in working in a cardiac catheterization laboratory. The curriculum allows students with the science background needed to master professional courses to integrate didactic and clinical practice. Graduates are eligible to take the National Board Examination for Registered Cardiovascular Technologists.

Medical Laboratory Science

The program in medical laboratory science enables students with a baccalaureate degree and sufficient background in the biological and chemical sciences to become eligible for certification in clinical microbiology, chemistry, hematology, immunohematology, or immunology. Depending upon the specialty, students must complete 18 to 23 quarter hours of professional coursework, which must include applied study at an affiliated clinical site. After completing the program, students may be eligible for the national certification examination in a specialty area. Completion requires 12 to 24 months of part-time study depending on prerequisite coursework, specialty chosen, and the timing of a student's entry into the program.

Perfusion Technology

The perfusion technology certificate program is open to professionals with a baccalaureate or master's degree. Candidates must have the science background needed to master professional courses in the curriculum. The curriculum allows students to integrate didactic, laboratory, and clinical practice courses over a twelve-month period. Graduates of the program are eligible to take the National Board Examination for Certified Cardiovascular Perfusionists.

Respiratory Therapy

An accelerated program in respiratory therapy is available for professionals with a baccalaureate or master's degree. The curriculum allows students with the science background needed to master professional courses to integrate didactic, laboratory and clinical practice over a twelve-month period. Graduates of the program are eligible to take the National Board Examination for Registered Respiratory Therapists.

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 Peter L. Nye, PhD
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Programs in the College of Business Administration are designed for students who are preparing to take on managerial responsibility. These programs help students develop the ability to recognize and solve business and organizational problems and understand the role of business in the community, the nation, and the world.

The college's goal is to help students develop ideals that are ethically sound and socially desirable; cultivate an awareness of the social, political, and economic developments to which businesses must adapt; develop sound judgment and effective communication skills; and develop their individual interests and talents.

Modern business faces many challenges from unprecedented political change and the effects of foreign policy, high technology, affirmative-action regulations, and new economic policies. These challenges have increased the demand for highly trained individuals equipped to analyze and address our economy's complex social and legal problems.

The college offers a Bachelor of Science degree in international business and in business administration with concentrations in accounting, entrepreneurship and small business management, finance and insurance, human resources management, international business, logistics and transportation, management, management information systems, and marketing. The business curriculum is enhanced by courses in the sciences, humanities, and social sciences. In addition to their academic courses, all students are required to complete a five-year or a four-year cooperative education plan.

Co-op provides a learning experience beyond the classroom. Textbook examples come to life in real-world business settings. Classroom theories are applied to actual business problems. In turn, these experiences serve to stimulate inquiry and discussion back in the classroom. This interaction between college studies and cooperative education sets the stage for a lifetime of learning.

The undergraduate program of the College of Business Administration meets the standards of the American Assembly of Collegiate Schools of Business for faculty and student quality, curriculum design, and overall University support.

Business majors go on to graduate work in business as well as public health-care and education administration. Many careers in law also require an understanding of business concepts. Although the Association of American Law Schools does not recommend particular courses for prelegal students, it does advise undergraduates to develop critical understanding of the institutions and values with which the law deals.

Class Entrance Requirements

Listed below are the quality-point averages required for students to advance to the next class year and to graduate.

	Overall QPA	Freshman Core Courses QPA*	Business Courses QPA
Sophomore	1.4	1.8	1.8
Middler	1.9		1.9
Junior	2.0		2.0
Senior	2.0		2.0
To graduate	2.0		2.0

*Freshman Core Courses refers to Freshman English I and II, Macro and Micro Economics, Calculus for Business, and Introduction to Business.

Graduation Requirements

Bachelor of Science degree candidates must complete all prescribed work of the curriculum in which they seek to qualify, currently 176 quarter hours. The degree not only represents the formal completion of selected courses, but also indicates professional study in the major or concentration. A quality-point average of C (2.0) and a C average in all business courses are required for graduation.

Minor in Business Administration

Students must be enrolled in a full program of studies in the College of Business Administration during the final three quarters preceding graduation.

All courses in the College of Business Administration are available to all nonbusiness students at Northeastern University if they meet the class standing and course requirements. Nonbusiness students may find the minor attractive if they are considering a career in business or pursuing an MBA. The minor consists of eight courses. Students who wish to enter the program should speak with an adviser in the Undergraduate Business Programs Office upon successful completion of at least the macro economics and college algebra courses. Students who complete all eight courses successfully and have earned at least a C (2.0) average in them will be awarded a minor in Business Administration at graduation.

Minor Curriculum

Background courses: MTH 1101, Applications of Algebra *or* MTH 1106, Functions and Algebra *or* MTH 1113, College Math for Business and Economics *or* better; ECN 1115, Principles of Macroeconomics.

Required courses: MGT 1115, Introduction to Business; ACC 1111, Accounting Principles 1; HRM 1432, Organizational Behavior *or* HRM 1431, Complex Organizations; FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing. Plus one of the following: MGT 1450, Business Policy; ENT 1330, Entrepreneurship; INB 1338, Introduction to International Business; MSC 1441, Operations Management.

Certificate programs. The College offers a number of certificate programs which recognize a business or nonbusiness student's acquired expertise in specified areas of specialization.

Curriculum for First Three Quarters

The courses taken in the first three quarters are the same for all concentrations.

Quarter 1	ECN 1115, Principles of Macroeconomics; ENG 1110, Freshman English 1; and two arts and sciences electives.
Quarter 2	MGT 1115, Introduction to Business; MTH 1114, Calculus for Business; and two arts and sciences electives.
Quarter 3	ECN 1116, Principles of Microeconomics; ENG 1111, Freshman English 2; and two arts and sciences electives.

Accounting

A concentration in accounting prepares the graduate for entry into one of the fastest growing and most critical areas of management. Accounting is an exacting field that requires accuracy, the ability to reason, and the skills to interpret business data and to deal with people. Accountants hold sensitive management positions in private firms in business or industry, public accounting firms, and governmental agencies.

To prepare for an accounting career, students take courses in financial and managerial reporting, systems design and installation, taxation, and auditing. Elective courses are available for more specialized study in cost accounting, accounting theory, planning and control, auditing, and taxes.

Students may also count up to eighteen months of cooperative education experience in auditing toward the three years required to become a Certified Public Accountant.

Bachelor of Science Curriculum

Quarters 1–3	See above.
Quarter 4	ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; MSC 1226, Computer-Based Information Systems; and one nonbusiness elective.
Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; a nonbusiness elective; and an open elective.
Quarter 6	ACC 1331, Intermediate Accounting 1; FIN 1438, Principles of Finance 1; and HRM 1433, Organizational Behavior and Design.
Quarter 7	ACC 1332, Intermediate Accounting 2; ACC 1339, Cost Accounting; FIN 1439, Principles of Finance 2; and MKT 1435, Introduction to Marketing.
Quarter 8	ACC 1343, Intermediate Accounting 3; ACC 1345, Accounting Systems; MSC 1441, Operations Management; and one nonbusiness elective.
Quarter 9	ACC 1347, Auditing; MSC 1433, Quantitative Models in Business; MGT 1446, Managing Social Issues; and upper division writing requirement.
Quarter 10	ACC 1351, Federal Income Tax 1; MGT 1450, Business Policy; and two open electives.
Quarter 11	Three open electives and a nonbusiness elective.

Entrepreneurship and Small Business Management

The concentration in entrepreneurship and small business management helps students develop the skills needed to work effectively within a small business or to start or acquire and manage their own.

Students learn to assess their personal aptitude and potential for small business; find and evaluate business opportunities; secure essential funding; and organize and manage such functional business areas as manufacturing, marketing, accounting, and finance. They will learn these important skills by taking courses in entrepreneurship, starting and managing new businesses, small business finance, and planning and growing new ventures.

This concentration also helps students prepare for careers in sales management, banking, public accounting, and other areas relevant to the small business environment.

During their senior year, students participate in the Small Business Institute Field Project. Offered in conjunction with the United States Small Business Administration, this unique course offers students the chance to work, under faculty guidance, as consultants to small business owners; students analyze company needs and help develop practical solutions to actual management problems.

Bachelor of Science Curriculum

Quarters 1–3	See page 76.
Quarter 4	ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; MSC 1226, Computer-Based Information Systems; and one nonbusiness elective.
Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; and two nonbusiness electives.
Quarter 6	ENT 1330, Management of Smaller Enterprises; FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing; and an open elective.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and MSC 1433, Quantitative Models in Business.
Quarter 8	ENT 1344, Opportunity Analysis and Venture Capital; a nonbusiness elective; an open elective; and upper division writing requirement.
Quarter 9	FIN 1770, Small Business Finance; MGT 1446, Managing Social Issues; MSC 1441, Operations Management; and an open elective.
Quarter 10	MGT 1450, Business Policy; ENT 1352, New Venture Creation; and two open electives.
Quarter 11	ENT 1358, Small Business Institute Field Project and two open electives.

Finance and Insurance

The role of people trained in finance and insurance is expanding rapidly within the business world. Changes on the financial scene—rising securities prices, fluctuating inflation and interest rates, and scarcity of capital—have created an awareness that financial knowledge is essential to the effective management of business firms.

Finance is the management and investment of money and other assets for business, financial institutions, nonprofit organizations, governments, and individuals.

The program draws on accounting principles, economic theory, and quantitative methods to direct the way money is managed, acquired, and distributed. Students learn how economic systems operate and how money markets work within economic systems. They also learn to analyze economic trends and indications and to examine the movement and distribution of money.

Students may specialize in one or more of the following areas: management finance, investment management and analysis, management of financial institutions, insurance and risk management, real estate, and financial planning. The program prepares students for careers in financial management, security analysis, investment management, security or insurance brokerage, underwriting, credit management, and risk management with corporations, commerce banks, insurance companies, and other financial institutions.

Bachelor of Science Curriculum

Quarters 1–3	See page 76.
Quarter 4	ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; MSC 1226, Computer-Based Information Systems; and a nonbusiness elective.
Quarter 6	FIN 1438, Principles of Finance 1; FIN 1333, Financial Institutions and Markets; MKT 1435, Introduction to Marketing; and a nonbusiness elective.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and MSC 1433, Quantitative Models in Business.
Quarter 8	FIN 1335, Managerial Finance; FIN 1346, Investment Management; upper-division writing requirement; and an open elective.

Quarter 9	MSC 1441, Operations Management; MGT 1446, Managing Social Issues; finance elective; and an open elective.
Quarter 10	MGT 1450, Business Policy; finance elective; and two open electives.
Quarter 11	Finance elective and three open electives.

Human Resources Management

Human resources management (HRM) focuses on the effective utilization of people at work. Traditionally, the major areas of HRM include employee relations, recruitment, selection, compensation, and training. Although expertise in these areas is necessary, major changes in the field have led to a more strategic role for the human resources professional. Today, human resource managers must be skilled in job and organizational design, innovative career planning, and leading effective internal change.

The successful management of human resources calls for a partnership among human resources professionals, labor relations negotiators, wage and salary analysts, and operating line managers in a company's functional areas (marketing, finance, and production). With the challenges brought about by an increasingly diverse work force and rapid international expansion, however, the importance of HRM has increased dramatically in recent years. HRM professionals now oversee organizational compliance with equal-opportunity laws, institute affirmative action procedures, and design or manage participative work systems.

Coursework focuses on a wide range of issues that affect human resources management: labor issues, negotiating strategies, psychological principles underlying organizational and human behavior, job enrichment, and organizational development activities.

Bachelor of Science Curriculum

Quarters 1–3	See page 76.
Quarter 4	ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; MSC 1226, Computer-Based Information Systems; and one nonbusiness elective.
Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; and two nonbusiness electives.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and MSC 1433, Quantitative Models in Business.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1332, Introduction to Human Resource Management; MKT 1435, Introduction to Marketing; and an open elective.
Quarter 8	HRM 1348, Reward Systems; HRM 1349, Assessment of Prospective Employees; MSC 1441, Operations Management; and an open elective.
Quarter 9	MGT 1446, Managing Social Issues; human resources management elective; upper division writing requirement; and an open elective.
Quarter 10	HRM 1345, Contemporary Labor Issues; MGT 1450, Business Policy; human resources management elective; and an open elective.
Quarter 11	Nonbusiness elective and three open electives.

International Business Administration

The recent growth of multinational firms, international trade, and regional international trading blocs has created a shortage of skilled managers who are equipped to analyze the complexities of international business.

The international business administration concentration fosters an understanding of problems involved in operating businesses across national boundaries and analyzes the operations of businesses in multinational environments.

It is increasingly common for multinational firms to require that candidates for top management positions have prior experience in international operations. In addition, large banks and insurance companies, governments, trade associations, and transnational bodies also have a growing need for managers who understand international business issues.

The concentration in international business administration includes broad-based courses dealing with the international environment as well as functional business courses with an international focus. Some of these courses are offered by the College of Business Administration; those in the humanities and social sciences are offered by the College of Arts and Sciences. All courses in the international business administration concentration are available to students in other concentrations during their middler, junior, and senior years.

Since most careers in international business begin in a functional area that has an international component, students are encouraged to complete a dual concentration. For example, students may combine a concentration in international business administration with one in finance, marketing, accounting, or human resources management. Students are also encouraged to develop competency in a foreign language, a skill viewed as a major asset by many prospective employers.

The College of Business Administration has extensive international contacts that enable many students to participate in international cooperative work experiences or internships.

Bachelor of Science Curriculum

Quarters 1–3	See page 76.
Quarter 4	ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; MSC 1226, Computer-Based Information Systems; and one open elective.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and INB 1338, Introduction to International Business.
Quarter 7	FIN 1439, Principles of Finance 2; MKT 1435, Introduction to Marketing; and MSC 1433, Quantitative Models in Business; and an open elective.
Quarter 8	MSC 1441, Operations Management; a business elective; an international non-business elective; and an open elective.
Quarter 9	FIN 1759, International Financial Markets; MGT 1446, Managing Social Issues; upper division writing requirement; and an international business elective.
Quarter 10	MGT 1450, Business Policy; an international nonbusiness elective; and two open electives.
Quarter 11	INB 1352, Seminar in International Business; an international business elective; and two open electives.

Logistics and Transportation

From the Fortune 500 manufacturer to the small retail firm that produces, sells, or distributes products, all companies have a logistics function that must be effectively managed if they are to be competitive. A logistics manager is typically involved in making critical decisions about such matters as the modes of transportation used to move the company's materials and products, inventory policies, warehousing needs, and the location of facilities.

As American corporations become increasingly involved in global markets, logistics managers play a major role not only in assessing the feasibility of international activity, but also in developing distribution networks to support that involvement. Logistics management is one of the most rapidly expanding areas of business.

The academic work in the program flows from introductory courses in transportation through advanced study in physical distribution management. Electives then provide in-depth examinations of how goods and services reach their destinations. The program culminates in a senior seminar. Courses address not only the viewpoints of corporate shippers and carriers, but also those of public officials and consumer advocates.

Logistics and transportation managers frequently interact with managers from other functional areas; it is useful for a student therefore to complete a dual concentration in finance, marketing, or another functional area.

In addition to corporations, companies (carriers) that sell transportation services offer rewarding career opportunities. The nation's carriers, including the airlines, railroads, trucking companies, and urban transit systems, increasingly rely on individuals who are skilled in logistics and transportation management.

Students interested in public policy and administration may pursue careers with the federal, state, and local government agencies involved in the financing and the economic and safety regulation of the transportation infrastructure.

Bachelor of Science Curriculum

Quarters 1–3	See page 76.
Quarter 4	ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; MSC 1226, Computer-Based Information Systems; and a nonbusiness elective.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and TRN 1333, The Domestic Transportation System.
Quarter 7	FIN 1439, Principles of Finance 2; a transportation elective; MKT 1435, Introduction to Marketing; and MSC 1433, Quantitative Models in Business.
Quarter 8	MSC 1441, Operations Management; a transportation elective; a nonbusiness elective; and an open elective.
Quarter 9	MGT 1446, Managing Social Issues; TRN 1344, Corporate Transportation/Logistics; an open elective; and an upper division writing requirement.

Quarter 10	MGT 1450, Business Policy; a transportation elective; and two open electives.
Quarter 11	TRN 1353, Seminar in Transportation and three open electives.

Management

The concentration in management is designed for the student with a strong interest in motivating people to provide goods and services creatively and productively.

The program helps students understand the various aspects of administrative practice and develop judgment and skills in organizational problem analysis and decision making. It focuses on three functional areas—marketing, finance, and operations—and explores the interrelation of these areas and the ways they can be used as management tools. To these are added the perspectives of law, accounting, and management information systems. Finally, the concentration includes several courses on business policy that are intended to develop skills in both the integrative and strategic roles of management.

Through extensive use of case studies, management simulations, and group research projects, students develop leadership skills. Faculty pay significant attention to “people problems” in order to stress the importance of developing an effective work force.

Bachelor of Science Curriculum

Quarters 1–3	See page 76.
Quarter 4	ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; MSC 1226, Computer-Based Information Services; and a nonbusiness elective.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and MSC 1433, Quantitative Models in Business.
Quarter 7	ACC 1330, Cost Accounting; FIN 1439, Principles of Finance 2; MKT 1331, Marketing Management; and MKT 1435, Introduction to Marketing.
Quarter 8	MGT 1345, Legal Aspects of Business; MSC 1441, Operations Management; a business elective; and an open elective.
Quarter 9	MGT 1446, Managing Social Issues; a business elective; an open elective; and upper division writing requirement.
Quarter 10	MGT 1450, Business Policy; a nonbusiness elective; and two open electives.
Quarter 11	Business elective and three open electives.

Management Information Systems

The concentration in management information systems (MIS) is designed to teach tomorrow’s managers how to derive the maximum benefit from state-of-the-art information technology.

The program provides a background in two distinct tracks. The first builds on the historical development of large and powerful computers that carry out organization-wide tasks, such as database management. The second track, often referred to as “end-user computing,” deals with the direct linkage of decision makers and user-friendly computer facilities.

Through an in-depth examination of case studies, the capstone senior year course, Business Systems Integration, illustrates how management information technology is used to identify and solve an organization’s information-related problems.

MIS managers interact frequently with other managers throughout an organization; therefore students are encouraged to complete a dual concentration in one of the functional areas of management.

Bachelor of Science Curriculum

Quarters 1–3	See page 76.
Quarter 4	ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; and two nonbusiness electives.
Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; MSC 1226, Computer-Based Information Systems; and one open elective.
Quarter 6	FIN 1438, Principles of Finance 1; HRM 1433, Organizational Behavior and Design; and an open elective.
Quarter 7	FIN 1439, Principles of Finance 2; MKT 1435, Introduction to Marketing; MSC 1335, Telecommunications and Networks; and MSC 1433, Quantitative Models in Business.
Quarter 8	MSC 1441, Operations Management; MSC 1330, Data Management; MSC 1332, Decision Support Systems for Business; and a nonbusiness elective.

Quarter 9	MGT 1446, Managing Social Issues; MSC 1336, Business Programming; upper division writing requirement; and a nonbusiness elective.
Quarter 10	MGT 1450, Business Policy; MSC 1350, Database Management Systems; MSC 1341, Information Resource Management; and one open elective.
Quarter 11	MSC 1342, Business Systems Integration and three open electives.

Marketing

A business not only designs and manufactures products, but also markets and sells them to manufacturers, wholesalers, retailers, and consumers. All the activities that direct the flow of goods and services from producer to consumer are classified as marketing concerns. Once an organization determines a customer's needs and wants, its first objective is to produce goods or services to satisfy that particular consumer. Essential in all types of businesses are product design, research, pricing, packaging, transportation, advertising, selling, and servicing.

The concentration in marketing is designed to familiarize students with the marketing process and to provide them with the theoretical concepts, skills, and tools necessary to successfully enter and advance in one of the many possible career paths. Students learn to evaluate consumer behavior, employ advertising principles, utilize market research and testing, and develop ways to position products and services in a favorable light. They also explore the changing economic, political, legal, ethical, and cultural contexts in which marketing strategies must be developed.

Students may select courses that lead to one of many career paths within marketing: product or brand management, marketing research, advertising management, retail management, sales management, or international marketing management.

Bachelor of Science Curriculum

Quarters 1–3	See page 76.
Quarter 4	ACC 1111, Accounting Principles 1; MSC 1200, Business Statistics 1; MSC 1226, Computer-Based Information Systems; and a nonbusiness elective.
Quarter 5	ACC 1112, Accounting Principles 2; MSC 1201, Business Statistics 2; and two nonbusiness electives.
Quarter 6	FIN 1438, Principles of Finance 1; MKT 1435, Introduction to Marketing; MSC 1433, Quantitative Models in Business; and a nonbusiness elective.
Quarter 7	FIN 1439, Principles of Finance 2; HRM 1433, Organizational Behavior and Design; and MKT 1331, Marketing Management.
Quarter 8	MKT 1341, Marketing Research; a marketing elective; an open elective; and upper division writing requirement.
Quarter 9	MGT 1446, Managing Social Issues; MSC 1441, Operations Management; a marketing elective; and an open elective.
Quarter 10	MKT 1351, Competitive Strategy; MGT 1450, Business Policy; and two open electives.
Quarter 11	Marketing elective and three open electives.

International Business

The College of Business Administration is offering a new and innovative degree program, the Bachelor of Science in international business. This program, the first of its kind in the United States, is for the highly motivated student who plans a career in import/export, international finance or manufacturing, or other areas that involve global markets.

Bachelor of Science in International Business

Students are admitted to a French, Spanish, or German track. They develop fluency in their chosen language and study the culture of the country or countries where that language is spoken. In addition, they participate in at least one cooperative education work experience or internship abroad in order to sharpen their language and business skills.

All students in the Bachelor of Science in International Business degree program must take the required courses in the international business administration concentration (see p. 78) and are encouraged to develop skills in other business areas such as finance, marketing, management, or human resources.

College of Computer Science

Larry A. Finkelstein, PhD, *Acting Dean*

Agnes H. Chan, PhD, *Acting Director of Graduate Studies*

Richard A. Rasala, PhD, *Director of Undergraduate Studies*

Marie P. Hinds, BS, *Assistant to the Dean*

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Carole D. Hafner, PhD

Viera K. Proulx, PhD

Ronald J. Williams, PhD

Bryant W. York, PhD

Assistant Professor

Luc Longpré, PhD

Joint Professor

R. Mark Goresky, PhD

Mathematics

The invention of powerful computers and the development of complex software programs have fundamentally transformed the way people work and live. Computers are now essential tools in business, industry, science, medicine, and human services. Computers also enhance the efforts of individuals and volunteer groups to meet their goals. In addition, the most sophisticated work in music, film, and video often makes use of computer technology. The College of Computer Science believes that computing is one of the most exciting fields of study and that its applications are limitless.

In the College of Computer Science, students learn about the principles and practices which support the development of high quality software. Computer science as a discipline draws its inspiration from many fields: mathematics, science, engineering, and art. From mathematics, students learn to think logically and to build complex structures from simple and secure components. From the experimental sciences, students learn to estimate the performance of algorithms and then test these estimates in real life. From engineering, students learn to treat program design as a complicated set of tradeoffs between computer resources (execution time, memory needs, peripherals), programmer resources (development time and available software tools), and customer needs (what must be done and how soon). Finally, from art, students learn to value the beauty of the internal program code as well as the quality of the external user interface. The College of Computer Science trains its students to understand and practice the diverse skills that are needed to make a significant contribution to the field of computing.

The undergraduate program in the College of Computer Science treats a variety of subject areas in computing, such as algorithms, data structures, programming language design, compilers, computer architecture, operating systems, database systems, graphics, artificial intelligence, and parallel computing. Qualified students may choose electives from a wide range of more advanced graduate courses. Students may also work individually with professors on research projects or may volunteer with the systems staff in order to enhance their technical experience.

The college offers two undergraduate degrees. The Bachelor of Science emphasizes strong technical competence in computer science, mathematics, physics, and electrical engineering. The Bachelor of Arts combines a computer science major with a broad-based liberal arts education. The Bachelor of Science program is accredited by the Computer Science Accreditation Board.

Normally, the undergraduate degree program is five years, including seven quarters of on-the-job cooperative education in industry. Students may complete the program in four years with a reduced cooperative education component. Because the experience acquired in industry can contribute tremendously to a student's academic and personal development, the college is strongly committed to the principle of cooperative education.

Class Entrance Requirements

The minimum overall quality-point averages listed are required for students to advance to the next rank and to graduate.

Sophomore	1.6
Middler	1.8
Junior	2.0
Senior	2.0
To graduate	2.0

In addition, a minimum quality-point average of 2.0 in all computer science courses (any course number with a COM prefix) is required for graduation. For additional information, consult the *College of Computer Science Undergraduate Student Guidebook*.

Minor in Computer Science

This minor is particularly valuable to non-computer science students seeking positions where a familiarity with computer science concepts and techniques is desirable. Four required level-one courses must be completed, plus three additional computer science courses elected from a number of courses specified by the college. Details may be obtained from the dean's office.

Five-Year Bachelor of Science Curriculum

Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, Freshman English 1; MTH 1123, Calculus 1; and one basic social science.
Quarter 2	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1124, Calculus 2; MTH 1137, Discrete Mathematics 1; and one basic social science.
Quarter 3	COM 1114, C Lab; COM 1201, Algorithms and Data Structures 2; ENG 1111, Freshman English 2; MTH 1125, Calculus 3; and one sub-area or general elective.
Quarter 4	COM 1130, Computer Organization and Programming 1; MTH 1223, Calculus 4; PHY 1221, Physics 1; PHY 1521, Physics 1 Lab; and one sub-area or general elective.
Quarter 5	COM 1110, FORTRAN Lab; COM 1204, Object-Oriented Design; ECE 1178, Digital Electronics for Computer Science; PHY 1222, Physics 2; PHY 1522, Physics 2 Lab; and one sub-area or general elective.
Quarter 6	COM 1330, Operating Systems Concepts; ECE 1229, Digital Systems Lab; ECE 1382, Computer Engineering 2; PHY 1223, Physics 3; and one sub-area or general elective.
Quarter 7	COM 1102, Functional Programming and Applications; COM 1350, Automata and Formal Language; ENG 1125, Technical Writing 1; and MTH 1237, Discrete Mathematics 2.
Quarter 8	COM 1205, Software Design; MTH 1301, Linear Algebra 1; SOC 1485, Computers and Society; and one computer science elective.
Quarter 9	MTH 1387, Probability 1; two computer science electives; and one sub-area or general elective.
Quarter 10	COM 1390, Algorithms; one computer science elective; and two sub-area or general electives.
Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; and three sub-area or general electives.

Four-Year Bachelor of Science Curriculum

Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, Freshman English 1; MTH 1123, Calculus 1; and one basic social science.
Quarter 2	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1124, Calculus 2; MTH 1137, Discrete Mathematics 1; and one basic social science.
Quarter 3	COM 1114, C Lab; COM 1201, Algorithms and Data Structures 2; ENG 1111, Freshman English 2; MTH 1125, Calculus 3; and one sub-area or general elective.
Quarter 4	COM 1130, Computer Organization and Programming 1; MTH 1223, Calculus 4; PHY 1221, Physics 1; PHY 1521, Physics 1 Lab; and one sub-area or general elective.
Quarter 5	COM 1204, Object-Oriented Design; ECE 1178, Digital Electronics for Computer Science; PHY 1222, Physics 2; PHY 1522, Physics 2 Lab; and one sub-area or general elective.

	Quarter 6	COM 1110, FORTRAN Lab; COM 1350, Automata and Formal Language; MTH 1387, Probability; and two sub-area or general electives.
	Quarter 7	COM 1330, Operating Systems Concepts; ECE 1229, Digital Systems Lab; ECE 1382, Computer Engineering 2; PHY 1223, Physics 3; and one sub-area or general elective.
	Quarter 8	COM 1102, Functional Programming and Applications; ENG 1125, Technical Writing 1; MTH 1237, Discrete Mathematics 2; and one computer science elective.
	Quarter 9	MTH 1301, Linear Algebra; two computer science electives; and one sub-area or general elective.
	Quarter 10	COM 1205, Software Design and Development; COM 1390, Algorithms; SOC 1485, Computers and Society; and one sub-area or general elective.
	Quarter 11	COM 1621, Senior Seminar; two computer science electives; and two sub-area or general electives.
Five-Year Bachelor of Arts Curriculum (with computer science courses beginning in the first year)	Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, Freshman English 1; MTH 1123, Calculus 1; and one arts and sciences core course.
	Quarter 2	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1124, Calculus 2; MTH 1137, Discrete Mathematics 1; and one arts and sciences core course.
	Quarter 3	COM 1114, C Lab; COM 1201, Algorithms and Data Structures 2; ENG 1111, Freshman English 2; MTH 1125, Calculus 3; and one general elective.
	Quarter 4	COM 1130, Computer Organization and Programming 1; one general elective; one science elective; and one arts and sciences core course.
	Quarter 5	COM 1102, Functional Programming and Applications; COM 1350, Automata and Formal Languages; MTH 1237, Discrete Mathematics 2; and one science elective.
	Quarter 6	COM 1390, Analysis of Algorithms; one general elective; one science elective; and one arts and sciences core course.
	Quarter 7	COM 1358, Analysis of Programming Languages; ENG ____, middler year writing requirement; and two arts and sciences core courses.
	Quarter 8	MTH 1301, Linear Algebra 1; SOC 1485, Computers and Society; one computer science elective; and one arts and sciences core course.
	Quarter 9	One computer science elective; one general elective; and two arts and sciences core courses.
	Quarter 10	One computer science elective; two general electives; and one arts and sciences core course.
	Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; two general electives; and one arts and sciences core course.
Five-Year Bachelor of Arts Curriculum (with computer science courses beginning in the second year)	Quarter 1	ENG 1110, Freshman English 1; MTH 1123, Calculus 1; one science elective; and one arts and sciences core course.
	Quarter 2	MTH 1124, Calculus 2; one general elective; one science elective; and one arts and sciences core course.
	Quarter 3	ENG 1111, Freshman English 2; MTH 1125, Calculus 3; one general elective; and one science elective.
	Quarter 4	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; MTH 1137, Discrete Mathematics 1; and two arts and sciences core courses.
	Quarter 5	COM 1101, Algorithms and Data Structures 1; COM 1122, Computer Science Overview 2; MTH 1237, Discrete Mathematics 2; and two arts and sciences core courses.
	Quarter 6	COM 1201, Algorithms and Data Structures 2; COM 1130, Computer Organization and Programming 1; one general elective; and one arts and sciences core course.

Year Bachelor of Curriculum

Quarter 7	COM 1102, Functional Programming and Applications; COM 1114, C Lab; COM 1350, Automata and Formal Language; ENG ____, middler year writing requirement; and one arts and sciences core course.
Quarter 8	COM 1390, Analysis of Algorithms; MTH 1301, Linear Algebra; SOC 1485, Computers and Society; and one general elective.
Quarter 9	COM 1358, Analysis of Programming Languages; one computer science elective; one general elective; and one arts and sciences core course.
Quarter 10	Two computer science electives; one general elective; and one arts and sciences core course.
Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; two general electives; and one arts and sciences core course.
Quarter 1	COM 1100, Fundamentals of Computer Science; COM 1121, Computer Science Overview 1; ENG 1110, Freshman English 1; MTH 1123, Calculus 1; and one arts and sciences core course.
Quarter 2	COM 1101, Algorithms and Data Structure 1; COM 1122, Computer Science Overview 2; MTH 1124, Calculus 2; MTH 1137, Discrete Mathematics 1; and one arts and sciences core course.
Quarter 3	COM 1114, C Lab; COM 1201, Algorithms and Data Structure 2; ENG 1111, Freshman English 2; MTH 1125, Calculus 3; and one general elective.
Quarter 4	COM 1130, Computer Organization and Programming 1; one science course; and two arts and sciences core courses.
Quarter 5	COM 1102, Functional Programming and Applications; COM 1350, Automata and Formal Languages; MTH 1237, Discrete Mathematics 2; and one science course.
Quarter 6	COM 1390, Analysis of Algorithms; one general elective; and two arts and sciences core courses.
Quarter 7	COM 1358, Analysis of Programming Languages; MTH 1301, Linear Algebra; SOC 1485, Computers and Society; and one science course.
Quarter 8	ENG ____, middler year writing requirement; one computer science elective; one general elective; and one arts and sciences core course.
Quarter 9	One computer science elective; one general elective; and two arts and sciences core courses.
Quarter 10	One computer science elective; two general electives; and one arts and sciences core course.
Quarter 11	COM 1621, Computer Science Seminar; one computer science elective; two general electives; and one arts and sciences core course.

College of Criminal Justice

James Alan Fox, PhD, *Dean*

Professors

Edith E. Flynn, PhD
George L. Kelling, PhD
John H. Laub, PhD
Nicole F. Rafter, PhD

Associate Professor

Wallace W. Sherwood, LL.M.

Visiting Professor

Harvey Burstein, JD

Assistant Professors

Susan Guarino-Ghezzi, PhD
Lorraine Green, PhD
Frank A. Schubert, JD
Mary Ann Zager, PhD

The College of Criminal Justice was established in 1967 as one of the first professional schools of its type. Since its founding, the college has become a leading force in education, research, and policy-making in both the public and private sectors.

The college has a single undergraduate major, leading to a Bachelor of Science degree in criminal justice, which comprehensively covers the field of criminal justice across both the public and private domains.

Careers in criminal justice involve the concerns and problems of people from all walks of life; therefore coursework integrates social sciences, behavioral sciences, and humanities with professional courses addressing such topics as terrorism, victimology, drug abuse, computer crime, criminal homicide, criminal investigation, prison overcrowding, women in criminal justice, ethics, and legal issues. The liberal content of the curriculum is an indispensable educational requirement for professional development.

The combined five-year academic and cooperative education program allows students to concentrate in one of three areas: policing and security, legal studies, and criminology and corrections.

In the policing and security program students learn firsthand the latest developments in policing in the United States, such as community policing, and gain an understanding of the field of security from a business rather than a law enforcement perspective.

The legal studies concentration teaches students how to analyze the mechanics of law and the legal process and to examine the historical and philosophical foundations of our legal system. Students who concentrate on legal studies are well-prepared for law school.

In the criminology and corrections concentration students investigate the causes of crime and assess various correctional responses to criminal offending. This program is viewed as a stepping stone to advanced graduate study and to employment in the corrections area.

Co-op provides opportunities in the full range of career settings, including parole or probation offices, law firms, police departments, private security agencies, public or private institutions, social and government agencies, prisons, and planning and evaluation units.

The college maintains close ties to criminal justice agencies in the community and hosts the Justice George Lewis Ruffin Society, an organization of minority criminal justice professionals dedicated to expanding minority involvement and leadership in the criminal justice system.

Class Entrance Requirements

Students are required to maintain the following overall quality-point averages to advance to the next class rank and to graduate.

Sophomore	1.4
Middler	1.6
Junior	1.8
Senior	1.9
To graduate	2.0

Graduation Requirements

Degree candidates must complete all prescribed work, a total of 176 quarter hours of credit. Students are also urged to meet the requirements of the Department of Cooperative Education.

Transfer Credit

No student transferring from another college or university is eligible to receive a degree until at least one year of academic work immediately preceding graduation has been completed at Northeastern.

**Bachelor of Science
Curriculum**

Quarter 1	CJ 1101, Administration of Criminal Justice; HST 1101, Western Civilization to 1648; POL 1110, Introduction to Politics; and PSY 1111, Foundations of Psychology 1.
Quarter 2	CJ 1112, Critical Issues in Criminal Justice; COM 1105, Computer Science and Its Applications; ENG 1110, Freshman English 1; and HST 1102, Western Civilization Since 1648.
Quarter 3	CJ 1151, Introduction to Law and Legal Process 1; ENG 1111, Freshman English 2; PSY 1112, Foundation of Psychology 2; and SOC 1100, Introduction to Sociology.
Quarter 4	CJ 1201, Criminology; CJ 1251, Introduction to Criminal Law; POL 1111, Introduction to American Government; and one math/science requirement.
Quarter 5	CJ 1252, Criminal Due Process; POL 1318, State and Local Government; one math/science requirement; and one non-criminal justice elective.
Quarter 6	CJ 1453, Criminal Justice Research Methods; ECN 1115, Principles of Macroeconomics; ENG 1350, Intermediate Writing; and one criminal justice elective.
Quarter 7	CJ 1454, Criminal Justice Statistics; ECN 1116, Principles of Microeconomics; one criminal justice elective; and one non-criminal justice elective.
Quarters 8–11	28 quarter hours of criminal justice electives and 36 quarter hours of non-criminal justice electives.

College of Engineering

Paul H. King, PhD, *Dean*

Richard J. Scranton, SM, *Associate Dean for Undergraduate Programs*

Thomas E. Hulbert, MS, PE, *Associate Dean and Director of the School of Engineering Technology*

Cynthia Snow, MA, *Assistant Dean for Administration*

David C. Blackman, MS, *Assistant Dean and Director of Minority Affairs*

Paula G. Leventman, PhD, *Assistant Dean and Director of Women in Engineering*

Candace A. Martel, MEd, *Director of Engineering Student Services*

The College of Engineering prepares students to contribute to the accumulation and application of technical knowledge. The college aims to help students master the fundamental mathematical and scientific principles underlying a particular branch of engineering; develop and demonstrate competence in analysis and design appropriate to an engineering specialization; reason clearly and communicate effectively; and recognize the need to continue professional development.

Through laboratory exercises, senior design projects, professional association activities, and cooperative work assignments, students put theory into practice and clarify their professional goals.

The college offers a Bachelor of Science degree with specializations in chemical, civil, electrical and computer, industrial, and mechanical engineering. Although most students choose to complete the Bachelor of Science degree program in five years including seven quarters of cooperative education experience, four-year options without co-op work or with four quarters of work are also available. Students indicate their preference for the four-year option in the winter quarter of the freshman year.

The college also offers a general engineering program leading to a Bachelor of Science degree without specialization; this option is appropriate for students who want a strong technical base for advanced study in such fields as law, medicine, or business. An option related to biomedical engineering is also available. Programs of study for both these options are arranged on an individual basis with a faculty adviser.

The college encourages students to study the social sciences and humanities, for they provide an awareness of the social, economic, political, aesthetic, and philosophical influences that shape the world in which graduates will practice their professions.

In addition to a full array of University services, special advising and other support services (including tutoring) are provided. Students may qualify to participate in honors sections of many courses. Active student chapters of many national professional engineering organizations and honor societies are supported by the college as an enriching addition to academic studies and co-op experience.

All Bachelor of Science degree programs with specification offered solely by the College of Engineering are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET). Part-time evening programs are also accredited.

The departments of electrical and computer engineering, industrial engineering and information systems, and mechanical engineering offer programs leading to both the bachelor's and master's degrees in five years. Degree candidates must maintain a 3.2 cumulative quality-point average, carry extra courses, and forego one cooperative work quarter in the senior year to complete the course requirements.

Academic standards are published in the *College of Engineering Student Guide*, available at 220 Snell Engineering Center.

The college reserves the right to amend programs, courses, and degree requirements to fulfill its educational responsibility to respond to relevant changes in the field.

Students must complete all of the requirements in the degree program in which they are candidates. Degree requirements are based upon the year of graduation, determined by the date of entry or re-entry into the College of Engineering. Degree requirements and the year of graduation for a degree candidate who fails to make normal academic progress for more than two quarters will be subject to review and possible change.

Students transferring from another college or university are not eligible to receive the Bachelor of Science degree unless they complete at least 48 quarter hours at Northeastern University immediately preceding their graduation.

Bachelor of Science/ Master of Science Joint Degree Program

Class Entrance Requirements

Graduation Requirements

Bachelor of Science Curriculum for First Three Quarters

Students in full-time engineering degree programs take the following courses in the first three quarters.

Quarter 1	ENG 1111, Freshman English 2; GE 1101, Engineering Problem Solving and Computation; MTH 1123, Calculus 1; PHY 1221, Physics 1; and PHY 1521, Physics Lab 1.
Quarter 2	CHM 1131, General Chemistry 1; ENG 1113, Great Themes in Literature; GE 1102, Engineering Problem Solving with Application Software; MTH 1124, Calculus 2; and PHY 1222, Physics 2.
Quarter 3	CHM 1132, General Chemistry 2; GE 1103, Engineering Design and Graphics; MTH 1125, Calculus 3; PHY 1223, Physics 3; and PHY 1523, Physics Lab 2.

Biomedical Engineering

Samuel Fine, SM, MD, *Professor and Director*

Biomedical engineers work on both theoretical and practical problems of biological and medical significance. They may study the mechanism of action of natural and synthetic macromolecules, analyze the properties of blood, or investigate the structure and function of human organ systems.

A program incorporating engineering and the biological sciences can provide a sound foundation for a doctorate in medicine or dentistry, for a career in research, public health, biomedical engineering, or biotechnology, or for work as an engineer in a hospital or government agency.

The health-care, pharmaceutical, and biotechnology industries, in particular, seek individuals with a strong background in engineering supplemented by biological science education. Other career opportunities may include public health, the psychological sciences, and the marine sciences.

The biomedical engineering option has no fixed curriculum. Students work with an adviser to choose courses in the biological sciences that complement the standard engineering curriculum.

Chemical Engineering

Ralph A. Buonopane, PhD, *Associate Professor and Chair*

Professors

John A. Williams, PhD
Donald L. Wise, PhD,
Cabot Corporation
Professor of
Chemical Engineering

Associate Professors

Bernard M. Goodwin, ScD
Richard R. Stewart, PhD
Ronald J. Willey, PhD

Assistant Professor

Gilda A. Barabino, PhD
DiPietro Professor of
Chemical Engineering

The chemical engineering program offers students a broad education that stresses the fundamentals of science, technology, and engineering and incorporates state-of-the-art computer-aided design and management of production processes. An undergraduate degree in chemical engineering provides a solid background for graduate study or practice in the many diverse areas of chemical engineering found in industry.

Chemical engineers are creative problem-solvers whose work touches all our lives. They are involved in creating new wonder drugs and materials that improve life on earth and make space exploration a reality.

Petrochemicals, biomedicines, pharmaceuticals, agricultural chemicals, plastics, fibers, and synthetic fuels are among the materials of the modern world that are the results of chemical engineering. Chemical engineers work on ways to reduce acid rain and smog, to recycle and reduce wastes, to develop new sources of environmentally clean energy, and to use existing resources safely and efficiently. Chemical engineers not only develop new products, but also seek ways to reduce costs, increase production, and improve the quality of existing products.

Cooperative education and career opportunities for chemical engineering students are found in companies working with all of these technologies that touch our lives. As students gain more knowledge through co-op and academic work, cooperative education assignments increase in responsibility and challenge towards fully professional levels.

Bachelor of Science Curriculum

Quarters 1-3	See above.
Quarter 4	CHE 1201, Chemical Engineering Calculations 1; CHE 1205, Computation Lab; CHM 1271, Organic Chemistry 1; MTH 1223, Calculus 4; and one social science/humanities elective.
Quarter 5	CHE 1202, Chemical Engineering Calculations 2; CHM 1272, Organic Chemistry 2 with Lab; MTH 1225, Differential Equations (Engineering) 1; and one social science/humanities elective.

Quarter 6	CHE 1211, Chemical Engineering Thermodynamics 1; CHM 1381, Physical Chemistry 1; CHM 1394, Experimental Physical Chemistry 1; MTH 1230, Linear Algebra; and one social science/humanities elective.
Quarter 7	CHE 1310, Chemical Engineering Thermodynamics 2; CHE 1321, Momentum Transport; CHM 1382, Physical Chemistry 2; CHM 1395, Experimental Physical Chemistry 2; and ENG 1125, Technical Writing 1.
Quarter 8	CHE 1415, Experimental Methods 1; CHE 1421, Chemical Engineering Kinetics; CHE 1431, Heat Transport; and ECN 1115, Principles of Macroeconomics.
Quarter 9	CHE 1416, Experimental Methods 2; CHE 1441, Separation Processes; CHE 1450, Chemical Engineering Economics; and one social science/humanities elective.
Quarter 10	CHE 1501, Process Design 1; CHE 1512, Chemical Process Control; one chemical engineering elective; and one engineering elective.
Quarter 11 (Spring only)	CHE 1502, Process Design 2; two chemical engineering electives; and one advanced chemistry elective.

Civil Engineering

Mishac K. Yegian, PhD, *Professor and Chair*

Professors

Frederic C. Blanc, PhD
John J. Cochrane, PhD
Constantine J. Gregory, PhD
Kenneth M. Leet, ScD

Associate Professors

Dionisio Bernal, PhD
Peter G. Furth, PhD
Robert L. Meserve, MS
John G. Schoon, PhD
Ali Touran, PhD
Chia-Ming Uang, PhD
Irvine W. Wei, PhD

Assistant Professors

Mark D. Evans, PhD
Neven Krstulovic-Opara, PhD
Daniel E. Medina, PhD
Thomas C. Sheahan, ScD

Adjunct Professors

Walter E. Jaworski, ScD

Civil engineers judiciously apply their knowledge of mathematics and physical sciences to improve and protect the environment and to provide facilities and structures for community living, industry, and transportation. Civil engineering encompasses several disciplines, including structural engineering, environmental engineering, transportation planning and engineering, and geotechnical engineering. Civil engineers supervise the construction of bridges, tunnels, buildings, dams, and aqueducts. Civil engineers plan, design, construct, and manage highways, railroads, canals, and airports; regulate rivers and control floods; design and build systems for water distribution, wastewater treatment, refuse disposal, and environmental remediation.

The civil engineering program offers a fundamental and rigorous yet flexible engineering education—an education that will weather inevitable changes within the field. The curriculum is intended to provide students with a solid background for careers in planning, design, construction, and engineering management. Students acquire a common base of knowledge in the engineering sciences, including structural mechanics, fluid mechanics, and environmental science. In more advanced courses, students learn to analyze and design structural systems (such as building frames and bridges), water and wastewater treatment systems, highways and mass transit systems, hydraulic systems, earth dams, and building foundations. Students use some of their electives to concentrate in one of four areas: structural, environmental, geotechnical, or transportation engineering.

Students also study the background within which they will practice engineering through a variety of courses in the social sciences and humanities, as well as specific courses dealing with law, professional ethics, and engineering management.

The co-op program parallels the academic program in level of responsibility and sophistication. A beginning job might involve layout at a construction site or laboratory testing; in senior level co-op assignments, students are often working alongside engineers on design teams.

Quarters 1–3	See page 89.
Quarter 4	CIV 1210, Structural Mechanics 1; CIV 1510, Materials; CIV 1511, Materials Lab; MTH 1223, Calculus 4; and one social science/humanities elective.
Quarter 5	CIV 1211, Structural Mechanics 2; CIV 1620, Engineering Measurements; CIV 1621, Engineering Measurements Lab; ECN 1116, Principles of Microeconomics; and MTH 1225, Differential Equations (Engineering) 1.

Bachelor of Science Curriculum

Quarter 6	CIV 1220, Structural Analysis 1; CIV 1226, Structural Analysis and Design Lab; CIV 1310, Fluid Mechanics; MTH 1230, Linear Algebra; and one social science/humanities elective.
Quarter 7	CIV 1240, Design of Reinforced Concrete Structures 1; CIV 1340, Environmental Engineering 1; CIV 1410, Soil Mechanics; CIV 1411, Soil Mechanics Lab; and ENG 1125, Technical Writing 1.
Quarter 8	CIV 1250, Design of Steel Structures 1; CIV 1625, Civil Engineering Computations Lab; ME 1320, Dynamics for Civil Engineers; and two technical electives.
Quarter 9	CIV 1665, Professional Issues for Civil Engineers; IIS 1366, Engineering Economy; CIV 1640, Applied Probability Theory for Civil Engineers; and two technical electives.
Quarter 10	Two technical electives; one social science/humanities elective; and one general elective.
Quarter 11	One capstone elective; two technical electives; and one social science/humanities elective.

Electrical and Computer Engineering

John G. Proakis, PhD, *William Lincoln Smith Professor and Chair*

Professors

Chung Chan, PhD
 Anthony J. Devaney, PhD
 James M. Feldman, PhD
 Samuel Fine, SM, MD
 Arvin Grabel, ScD
 Jack I. Hanania, PhD
 Sarma S. Mulukutla, PhD
 Sheila Prasad-Hinchey, PhD
 Harold R. Raemer, PhD,
*George A. Snell Professor
 of Engineering*
 J. Spencer Rochefort, MS
 Sheldon S. Sandler, PhD
 Martin E. Schetzen, ScD
 Philip E. Serafim, ScD
 Michael B. Silevitch, PhD
 Carmine Vittoria, PhD

Associate Professors

Soeren Buus, PhD
 Vinay Ingle, PhD
 Clas A. Jacobson, PhD
 Wayne G. Kellner, ScD
 Hanoeh Lev-Ari, PhD
 Stephen W. McKnight, PhD
 Robert N. Martin, MS
 Nicol E. McGruer, PhD
 Lazaros Merakos, PhD
 Ramachandran Raghavan, PhD
 Carey M. Rappaport, ScD
 Bahram Shafai, ScD
 Man-Kuan Vai, PhD
 Paul M. Zavracky, PhD

Assistant Professors

David Brady, PhD
 Dana Brooks, PhD
 Jill D. Crisman, PhD
 Edward W. Czeck, PhD
 Leonard E. Kay, PhD
 Anthony B. Maddox, PhD
 Dhamir N. Mannai, PhD
 Elias S. Manolakos, PhD
 David J. McLaughlin, PhD
 Sampath Rangarajan, PhD
 Masoud Salehi, PhD
 Aleksandar M. Stankovic, PhD
 Charles Surya, PhD
 Gilead Tadmor, PhD

Lecturer

Jacob Shekel, DSc

In electrical and computer engineering, students gain the knowledge and skills to address such problems as transferring and managing information, improving industrial productivity, conserving energy, and finding alternative energy sources. Electrical engineers have had a primary role in the development of the computer, integrated circuits, the pacemaker, satellite communication, space navigation, microprocessors, television, and the means of providing energy.

Some electrical engineers work in traditional areas of system design and development; others apply their skills in areas as diverse as ocean exploration, meteorology, transportation, experimental psychology, electronic music, health care systems, bioelectronics, and the development of educational devices for individuals with special needs.

The curriculum incorporates both information sciences, which focus on systems whose function is computation, communication, or control, and energy resources, which focus on the sources, generation, and distribution of large quantities of electrical energy.

The academic program is supported by extensive laboratory facilities for study and experimentation in computing, circuit analysis, electronics, digital systems, microwaves, control systems, semiconductor processing, VLSI design, digital signal processing, and power and energy conversion.

In addition to electrical engineering, the department offers options in computer engineering and power systems engineering. All options are based on a common core program, with a special concentration

during the last two years of study. The computer engineering option allows specialization in designing and integrating digital computers within larger systems for communications, resource management, and automatic control. The power systems engineering option is conducted in cooperation with electric power companies in New England and other eastern states and allows students to specialize in energy resources.

In the cooperative work phase of the program, co-op jobs generally increase in the level of responsibility as students gain theoretical and technical knowledge through their academic work. A sophomore might begin cooperative work experience as an engineering assistant and progress by the senior year to a position with responsibilities similar to entry-level engineers.

Option in Computer Engineering

For those who wish to specialize in designing and integrating digital computers within larger systems for communications, resource management, and automatic control, this option offers a basic but comprehensive knowledge of the principles underlying the organization, design, and applications of digital processing systems. Both hardware and software design are covered.

Option in Power Systems Engineering

This option is designed for students who wish to specialize in energy resources. The program is conducted in cooperation with electric power companies in New England and several eastern states.

Bachelor of Science in Electrical Engineering Curriculum

Quarters 1–3	See page 89.
Quarter 4	ECE 1215, Circuits and Systems 1; ECE 1221, Measurements Lab; MTH 1223, Calculus 4; PHY 1224, Physics 4; and one social science/humanities elective.
Quarter 5	ECE 1216, Circuits and Systems 2; ECE 1222, Circuits Lab 1; ME 1321, Mechanics for Electrical Engineers; MTH 1225, Differential Equations (Engineering) 1; and one social science/humanities elective.
Quarter 6	ECE 1217, Circuits and Systems 3; ECE 1223, Circuits Lab 2; ECE 1346, Electronics 1; ECE 1381, Computer Engineering 1; and ME 1340, Thermodynamics <i>or</i> ME 1386, Materials Science.
Quarter 7	ECE 1224, Electronics Lab 1; ECE 1229, Digital Systems Lab; ECE 1332, Linear Systems 1; ECE 1347, Electronics 2; ECE 1382, Computer Engineering 2; and ENG 1125, Technical Writing.
Quarter 8	ECE 1225, Electronics Lab 2; ECE 1226, Discrete Systems Lab; ECE 1333, Linear Systems 2; ECE 1349, Electronic Design 1; ECE 1363, Electromagnetic Field Theory 1; and ECE 1383, Computer Engineering 3.
Quarter 9	ECE 1227, Electromagnetic Fields Lab 1; ECE 1364, Electromagnetic Field Theory 2; MTH 1384, Probability for Engineering; one social science/humanities elective; and one technical elective.
Quarter 10	ECE 1228, Electromagnetic Fields Lab 2; ECE 1365, Electromagnetic Fields and Energy Conversion; ECE 1454, Communication Systems; one social science/humanities elective; and one technical elective.
Quarter 11	ECE 1408, Physical Electronics <i>or</i> ECE 1420, Control Systems and ECE 1235, Control Lab <i>or</i> ECE 1465, Wave Transmission and Reception; one social science/humanities elective; and two technical electives.

Bachelor of Science in Computer Engineering Curriculum

Quarter 1–3	See page 89.
Quarter 4	ECE 1215, Circuits and Systems 1; ECE 1221, Measurements Lab; MTH 1223, Calculus 4; PHY 1224, Physics 4; and one social science/humanities elective.
Quarter 5	ECE 1216, Circuits and Systems 2; ECE 1222, Circuits Lab 1; ME 1321, Mechanics for Electrical Engineers; MTH 1225, Differential Equations (Engineering) 1; and one social science/humanities elective.
Quarter 6	ECE 1217, Circuits and Systems 3; ECE 1223, Circuits Lab 2; ECE 1346, Electronics 1; ECE 1381, Computer Engineering 1; and ME 1340, Thermodynamics <i>or</i> ME 1386, Materials Science.
Quarter 7	ECE 1224, Electronics Lab 1; ECE 1229, Digital Systems Lab; ECE 1332, Linear Systems 1; ECE 1347, Electronics 2; ECE 1382, Computer Engineering 2; and ENG 1125, Technical Writing.
Quarter 8	ECE 1225, Electronics Lab 2; ECE 1226, Discrete Systems Lab; ECE 1333, Linear Systems 2; ECE 1349, Electronic Design 1; ECE 1363, Electromagnetic Field Theory 1; and ECE 1383, Computer Engineering 3.

**Bachelor of Science in
Power Systems
Engineering Curriculum**

Quarter 9	ECE 1227, Electromagnetic Fields Lab 1; ECE 1364, Electromagnetic Field Theory 2; ECE 1384, Computer Engineering 4; MTH 1384, Probability for Engineering; and one social science/humanities elective.
Quarter 10	ECE 1228, Electromagnetic Fields Lab 2; ECE 1230, VLSI Systems Design Lab; ECE 1351, Topics in IC Design; ECE 1365, Electromagnetic Fields and Energy Conversion; ECE 1454, Communication Systems; and one social science/humanities elective.
Quarter 11	Three technical electives and one social science/humanities elective.
Quarters 1–3	See page 89.
Quarter 4	ECE 1215, Circuits and Systems 1; ECE 1221, Measurements Lab; MTH 1223, Calculus 4; PHY 1224, Physics 4; and one social science/humanities elective.
Quarter 5	ECE 1216, Circuits and Systems 2; ECE 1222, Circuits Lab 1; ME 1321, Mechanics for Electrical Engineers; MTH 1225, Differential Equations (Engineering) 1; and one social science/humanities elective.
Quarter 6	ECE 1217, Circuits and Systems 3; ECE 1223, Circuits Lab 2; ECE 1346, Electronics 1; ECE 1381, Computer Engineering 1; and ME 1340, Thermodynamics 1.
Quarter 7	ECE 1224, Electronics Lab 1; ECE 1229, Digital Systems Lab; ECE 1332, Linear Systems 1; ECE 1347, Electronics 2; ECE 1382, Computer Engineering 2; and ENG 1125, Technical Writing.
Quarter 8	ECE 1225, Electronics Lab 2; ECE 1226, Discrete Systems Lab; ECE 1333, Linear Systems 2; ECE 1349, Electronic Design 1; ECE 1363, Electromagnetic Field Theory 1; and one social science/humanities elective.
Quarter 9 (Spring only)	ECE 1227, Electromagnetic Fields Lab 1; ECE 1364, Electromagnetic Field Theory 2; ECE 1471, Electrical Power Systems 1; MTH 1384, Probability for Engineering; and one social science/humanities elective.
Quarter 10 (Winter only)	ECE 1228, Electromagnetic Fields Lab 2; ECE 1231, Electrical Power Lab 1; ECE 1365, Electromagnetic Fields and Energy Conversion; ECE 1472, Electrical Power Systems 2; one social science/humanities elective; and one technical elective.
Quarter 11 (Spring only)	ECE 1232, Electrical Power Lab 2; ECE 1371, Electrical Machines 1; ECE 1379, Transients in Electrical Power Systems; ECE 1474, Power Electronics; and one technical elective.

General Engineering
Advisory Committee

Richard R. Stewart, PhD, *Chemical Engineering, Chair*

Peter Furth, PhD, *Civil Engineering*

Arvin Grabel, ScD, *Electrical Engineering*

Ronald F. Perry, PhD, *Industrial Engineering*

Mohamad Metghalchi, ScD, *Mechanical Engineering*

The goal of the general engineering program is to provide students with flexible, interdisciplinary opportunities to study basic engineering concepts plus courses in areas related to their interests, such as business or science.

This program is designed for students interested in engineering-related professions rather than a specific engineering discipline. It is highly elective and enables students to tailor their studies to meet their particular objectives. A general engineering background offers the foundation for advanced study in such areas as medicine, law, or business, particularly for those interested in the more technical aspects or applications of those professions. Students who complete an adviser-approved program receive an unspecified Bachelor of Science degree from the College of Engineering.

**Bachelor of Science
Curriculum**

Quarters 1–3	See page 89.
Quarter 4	MTH 1223, Calculus 4; one basic science elective; one engineering science elective; and one social science/humanities elective.

Quarter 5	MTH 1225, Differential Equations (Engineering) 1; one engineering science elective; one coordinated study elective; and one social science/humanities elective.
Quarter 6	ENG 1340, Writing Workshop 1; one engineering science elective; two coordinated study electives; and one social science/humanities elective.
Quarter 7	Two engineering science electives; one coordinated study elective; and one social science/humanities elective.
Quarter 8	Two engineering science electives and two coordinated study electives.
Quarter 9	Two engineering science electives and two coordinated study electives.
Quarter 10	Two engineering science electives and two coordinated study electives.
Quarter 11	One engineering science elective and three coordinated study electives.

Industrial Engineering and Information Systems

Stuart Jay Deutsch, PhD, *Professor and Chair*

Professors

Thomas P. Cullinane, PhD
Carolyn D. Heising, PhD
Ronald R. Mourant, PhD

Associate Professors

Nasser Fard, PhD
Surendra M. Gupta, PhD
Thomas E. Hulbert, MS
Mieczyslaw M. Kokar, PhD
Emanuel S. Melachrinoudis, PhD
Ronald F. Perry, PhD
Gerard Volland, PhD
Ching-Cheng Wang, PhD

Assistant Professors

M. Louis Brennan, PhD
Mary E. Helander, PhD
Jason Kim, PhD
Anthony B. Maddox, PhD

Industrial engineering involves the design and analysis of systems that include people, equipment, and materials and their interactions and performance in the workplace. The industrial engineer collects this information and evaluates alternatives to make decisions that best advance particular organizational goals.

The program in industrial engineering and information systems offers students a base of traditional engineering courses such as production systems, work design, probability, statistics, and engineering economy, while emphasizing such contemporary areas as simulation, material handling, computer software, quality control, and operations research.

To gain the skills they need to make informed managerial and professional decisions, students take courses in management, economics, and technical subjects, as well as in the humanities and social sciences.

Industrial engineers work in manufacturing firms, hospitals, banks, public utilities, government agencies, insurance companies, and construction firms. Among the projects they undertake are design and implementation of a computer-integrated manufacturing system, design of a robotics system in a manufacturing environment, long-range corporate planning, development and implementation of a quality-control system, design of workstations to enhance worker safety and productivity, and development of computer systems for information control.

Co-op jobs generally increase in difficulty as students gain theoretical and technical knowledge through their academic work. A sophomore might begin as a computer analyst evaluating the performance of a manufacturing system and progress to designing manufacturing engineering work stations by the senior year.

Bachelor of Science Curriculum

Quarters 1–3	See page 89.
Quarter 4	ECN 1115, Principles of Macroeconomics; IIS 1200, Work Design; MTH 1223, Calculus 4; and one behavioral science, social science, or humanities elective.
Quarter 5	ECN 1116, Principles of Microeconomics; IIS 1330, Computation and Programming 1; ME 1201, Statics; and MTH 1225, Differential Equations (Engineering) 1.
Quarter 6	ECE 1171, Electrical Engineering 1; ENG 1125, Technical Writing; IIS 1300, Probabilistic Analysis for Engineers; and MTH 1230, Linear Algebra.
Quarter 7	IIS 1360, Engineering Economy; one engineering science elective; one technical elective; and one behavioral science, social science, or humanities elective..
Quarter 8	IIS 1310, Statistics; IIS 1340, Operations Research 1; IIS 1475, Human-Machine Systems; and HRM 1431, Complex Organizations.
Quarter 9	IIS 1341, Operations Research 2; IIS 1350, Digital Simulation Techniques; IIS 1436, Quality Assurance; one engineering science elective; and one open elective.

Quarter 10	IIS 1405, Production and Inventory Control; two technical electives; and one behavioral science, social science, or humanities elective.
Quarter 11	IIS 1401, Design Project; two IIS technical electives; and one behavioral science, social science, or humanities elective.

Mechanical Engineering

John W. Cipolla, Jr., PhD, *Professor and Chair*

Professors

George G. Adams, PhD
 Charles A. Berg, ScD
 Alexander M. Gorlov, PhD
 Hamid Nayeb-Hashemi, PhD
 Richard J. Murphy, PhD
 Welville B. Nowak, PhD,
*Smith Professor of
 Engineering*
 John N. Rossettos, PhD
 Mohammad E. Taslim, PhD
 Ibrahim Zeid, PhD

Associate Professors

Charles W. Finn, PhD
 Olusegun J. Ilegbausi, PhD
 Gregory J. Kowalski, PhD
 Mohamad Metghalchi, ScD
 Uichiro Narusawa, PhD

Assistant Professors

Yiannis A. Levendis, PhD
 Andrew V. Tangborn, PhD
 Mary Grace Williams, PhD
 Bruce H. Wilson, PhD

Professors Emeriti

Ralph S. Blanchard, MS
 Arthur R. Foster, MEng
 Bertram S. Long, MEng
 Alvin J. Yorra, MS

Mechanical engineering involves the design, development and manufacture of machinery and devices to transmit power or to convert energy from thermal to mechanical form in order to power the modern world and its machines. Its current practice has been heavily influenced by recent advances in computer hardware and software.

Mechanical engineers use computers to formulate preliminary and final designs of systems or devices, to perform calculations that predict the behavior of the design, and to collect and analyze performance data from system testing or operation.

Traditionally, mechanical engineers have designed and tested such devices as heating and air-conditioning systems, machine tools, internal combustion engines, and steam power plants. Today they also play primary roles in the development of new technologies in a variety of fields—energy conversion, solar energy utilization, environmental control, prosthetics, transportation, manufacturing, and new materials development.

The curriculum in mechanical engineering focuses on three areas: applied mechanics, thermofluids engineering, and materials science. Applied mechanics is the study of the motion and deformation of the structural elements acted on by forces in devices that range from rotating industrial dynamos to dentists' drills. Thermofluids engineering deals with the motion of fluids and the transfer of energy, as in the cooling of electronic components or the design of gas turbine engines. Materials science is concerned with the relationship between the structure and properties of materials and with the control of structure, through processing, to achieve the desired properties. Practical applications are in the development of composite materials and in metallurgical process industries.

Courses in each area form the foundation for advanced analytical and creative design courses that culminate in a two-quarter senior design project. Faculty encourage students throughout the curriculum to use computer-aided design tools and high-performance computer workstations.

Cooperative education assignments increase in responsibility and technical challenge as students progress through the program. Initial positions may involve computer intensive CAD/CAM assignments or programming tasks, while more advanced jobs will place students in charge of quality control systems and performance testing of equipment.

Bachelor of Science Curriculum

Quarters 1–3	See page 89.
Quarter 4	ECN 1115, Principles of Macroeconomics or ECN 1116, Principles of Microeconomics; ME 1201, Statics; ME 1360, Thermodynamics 1; and MTH 1223, Calculus 4.
Quarter 5	ME 1392, Measurement and Analysis; ME 1202, Dynamics 1; ME 1361, Thermodynamics 2; and MTH 1225, Differential Equations (Engineering) 1.
Quarter 6	ENG 1340, Writing Workshop; ME 1203, Strength of Materials 1; ME 1315, Dynamics 2; ME 1375, Fluid Mechanics 1; and MTH 1226, Differential Equations (Engineering) 2.
Quarter 7	ME 1314, Strength of Materials 2; ME 1365, Heat Transfer; MTH 1230, Linear Algebra; and ME 1380, Materials Science.
Quarter 8	ME 1335, Mechanical Design; ME 1362, Thermodynamics 3; ME 1480, Mechanical Behavior of Materials; or ECE 1171, Electrical Engineering; and one

social science/humanities elective.

Quarter 9	ME 1337, Thermal Design; ME 1415, Mechanical Vibrations; ME 1483, Materials Processing or ECE 1171, Electrical Engineering; and one social science/humanities elective.
Quarter 10	ME 1336, Design Project 1; two technical electives*; and one social science/humanities elective.
Quarter 11	ME 1338, Design Project 2; two technical electives*; and one social science/humanities elective.

*An approved physics/science elective must be taken in either quarter 10 or quarter 11.

Part-Time Evening Engineering

The Part-Time Engineering Program is designed to meet the needs of individuals who must combine full-time work responsibilities with part-time evening study. This six-year, part-time evening curriculum leads to a degree of Bachelor of Science in civil, electrical, or mechanical engineering. Admissions and course requirements are identical to the full-time, five-year cooperative degree programs. For an application and more information contact 220 Snell, 373-2185. The program coordinator is Caryn Vigoda, MEd.

Part-Time Evening Curriculum for Bachelor of Science

All programs follow the same curriculum for years one and two.

First Year	Fall Quarter	GE 1101, Problem Solving and Computation and MTH 1123, Calculus 1.
	Winter Quarter	CHM 1131, Chemistry 1; GE 1102, Problem Solving with Application Software; and MTH 1124, Calculus 2.
	Spring Quarter	CHM 1132, Chemistry 2 and MTH 1125, Calculus 3.
	Summer Quarters	During the summer quarters students are expected to take ENG 1111, Freshman English 2; ENG 1113, Great Themes in Literature; ENG 1125, Technical Writing; ECN 1116, Principles of Microeconomics; four adviser-approved social science/humanities electives; and CIV 1665, Professional Issues in Civil Engineering.
Second Year	Fall Quarter	MTH 1223, Calculus 4; PHY 1221, Physics 1; and PHY 1521, Physics 1 Lab.
	Winter Quarter	MTH 1225, Differential Equations (Engineering) 2; and PHY 1222, Physics 2.
	Spring Quarter	GE 1103, Engineering Graphics and Design; PHY 1223, Physics 3; and PHY 1522, Physics 2 Lab.

Part-Time Evening Curriculum for Bachelor of Science in Civil Engineering

Third Year	Fall Quarter	CIV 1210, Structural Mechanics 1; and CIV 1620, Engineering Measurements <i>or</i> CIV 1340, Environmental Engineering 1.
	Winter Quarter	CIV 1211, Structural Mechanics 2; MTH 1230, Linear Algebra <i>or</i> CIV 1640, Applied Probability Theory for Civil Engineers; and CIV 1625, Civil Engineering Computations Lab.
	Spring Quarter	CIV 1310, Fluid Mechanics; CIV 1410, Soil Mechanics and CIV 1411, Soil Mechanics Lab <i>or</i> CIV 1510, Materials and CIV 1511, Materials Lab.
Fourth Year	Fall Quarter	CIV 1220, Structural Analysis 1; and CIV 1620, Engineering Measurements <i>or</i> CIV 1340, Environmental Engineering 1.
	Winter Quarter	CIV 1240, Design of Reinforced Concrete Structures 1; CIV 1625, Civil Engineering Computations Lab; and MTH 1230, Linear Algebra <i>or</i> CIV 1640, Applied Probability Theory for Civil Engineers.
	Spring Quarter	CIV 1310, Fluid Mechanics; and CIV 1410, Soil Mechanics and CIV 1411, Soil Mechanics Lab <i>or</i> CIV 1510, Materials and CIV 1511, Materials Lab.

Environmental Concentration

Fifth and Sixth Years	CIV 1245, Advanced Structure Design; CIV 1320, Hydraulic Engineering; CIV 1341, Environmental Engineering 2; CIV 1350, Environmental/Hydraulic Lab;
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Structural Concentration	Fifth and Sixth Years		CIV 1395, Environmental Design Project; CIV 1420, Foundation Engineering; CIV 3636, Transportation Engineering; CIV 3642, Transportation Planning; IIS 1366, Engineering Economy; ME 1320, Dynamics; ME 1340, Thermodynamics; and a general elective.
			CIV 1222, Structural Analysis 2; CIV 1245, Advanced Structure Design; CIV 1295, Structural Design Project; CIV 1320, Hydraulic Engineering; CIV 1341, Environmental Engineering 2; CIV 1420, Foundation Engineering; CIV 3636 Transportation Engineering; CIV 3642, Transportation Planning; IIS 1366 Engineering Economy; ME 1320, Dynamics; ME 1340, Thermodynamics; and a general elective.
		Summer Quarters	During the summer quarters students are expected to take ENG 1111, Freshman English 2; EGN 1113, Great Themes in Literature; ECN 1116, Principles of Microeconomics; ENG 1125, Technical Writing 1; four adviser-approved social science/humanities electives; and CIV 1665, Professional Issues in Civil Engineering.
Part-Time Evening Curriculum for Bachelor of Science in Electrical and Computer Engineering	Third Year	Fall Quarter	ECE 1215, Circuits and Systems 1; ECE 1221, Measurements Lab; and PHY 1224, Physics 4.
		Winter Quarter	ECE 1216, Circuits and Systems 2; ECE 1222, Circuits Lab 1; and ME 1321, Mechanics for Electrical Engineers.
		Spring Quarter	ECE 1217, Circuits and Systems 3; ECE 1223, Circuits Lab 2; and MTH 1384, Probability.
	Fourth Year	Fall Quarter	ECE 1332, Linear Systems 1 and ECE 1346, Electronics 1.
		Winter Quarter	ECE 1224, Electronics Lab 1; ECE 1226, Discrete Systems Lab 1; ECE 1333, Linear Systems 2; and ECE 1347, Electronics 2.
		Spring Quarter	ECE 1225, Electronics Lab 2; ECE 1349, Electronic Design 1; and ME 1340, Thermodynamics 1 or ME 1386, Materials Science.
	Fifth Year	Fall Quarter	ECE 1363, Electromagnetic Field Theory 1 and ECE 1381, Computer Engineering 1.
		Winter Quarter	ECE 1227, Electromagnetic Field Lab; ECE 1229, Digital Systems Lab; ECE 1364, Electromagnetic Field Theory 2; and ECE 1382, Computer Engineering 2.
		Spring Quarter	ECE 1228, Electromagnetic Field and Energy Conversion Lab 2; ECE 1365, Electromagnetic Fields and Energy Conversion; and ECE 1383, Computer Engineering 3.
	Sixth Year	Fall Quarter	Choose two technical electives from the following. ECE 1351, Special Topic IC Design and ECE 1230, VLSI System Design Lab; ECE 1408, Physical Electronics; ECE 1471, Electrical Power Systems 1; or ECE 1486, Numerical Methods and Computer Applications.
		Winter Quarter	Choose two technical electives from the following. ECE 1420, Control Systems and ECE 1235, Control Systems Lab; ECE 1384, Computer Engineering 4; ECE 1472, Electrical Power Systems 2 and ECE 1231, Electric Power Lab or MTH 1351, Function of a Computer Variable.
		Spring Quarter	ECE 1454, Communication Systems; ECE 1456, Digital Signal Processing and ECE 1234, Digital Signal Processing Lab or ECE 1465, Wave Transmission and Reception.
		Summer Quarters	During the summer quarters students are expected to take ENG 1111, Freshman English 2; ENG 1113, Great Themes in Literature; ECN 1116, Principles of Microeconomics; and five adviser-approved social science/humanities electives.

**Part-Time Evening
Curriculum for Bachelor
of Science in Mechanical
Engineering**

Third Year	Fall Quarter	ME 1201, Statics and PHY 1224, Physics 4.
	Winter Quarter	ME 1392, Measurements and Analysis and MTH 1230, Linear Algebra.
	Spring Quarter	MTH 1226, Mathematical Analysis 2 and ME 1360, Thermodynamics 1.
Fourth Year	Fall Quarter	ME 1203, Strength of Materials 1 and ME 1361, Thermodynamics 2.
	Winter Quarter	ME 1202, Dynamics 1 and ME 1375, Fluid Mechanics.
	Spring Quarter	ME 1314, Strength of Materials 2 and ME 1365, Heat Transfer.
Fifth Year	Fall Quarter	ME 1335, Mechanical Design and ME 1337, Thermal Design.
	Winter Quarter	ME 1336, Design Project 1 and ME 1380, Materials Science.
	Spring Quarter	ME 1338, Design Project 2 and ME 1480, Mechanical Behavior of Materials.
	Summer Quarter	An additional ME technical elective is required in the summer following the fifth year.
Sixth Year	Fall Quarter	ECE 1171, Electrical Engineering 1 and ME 1362, Thermodynamics 3.
	Winter Quarter	ENG 1340, Writing Workshop; ME 1315, Dynamics 2; and one technical elective.
	Spring Quarter	ME 1415, Mechanical Vibrations; and one technical elective.
	Summer Quarters	During the summer quarters students are expected to take ENG 1111, Freshman English 2; ENG 1113, Great Themes in Literature; ECN 1115, Principles of Macroeconomics; ECN 1116, Principles of Microeconomics; and four adviser-approved social science/humanities electives.

School of Engineering Technology

Thomas E. Hulbert, MS, PE, *Director and Associate Dean of Engineering*

Roy Dalsheim, BS, *Assistant Director*

Rasma Galins, *Assistant Director*

Rosanne L. Bogan, BS, *Staff Assistant*

Professor

Samuel Fine, MD

*Electrical Engineering
Technology*

Associate Professors

David S. Goldman, MS, PE

Computer Technology

Eric W. Hansberry, MS

Design Graphics

George F. Kent, MS, MBA, PE

*Mechanical Engineering
Technology*

Nonna K. Lehmkuhl, MEd, MS

Computer Technology

Assistant Professors

John E. Hajjar, PhD

Computer Technology

Frederick J. Nohmer, EdD

*Electrical Engineering
Technology*

Lecturers

Ronald E. Scott, ScD, PE

*Electrical Engineering
Technology*

Jerome Tapper, BS, PE

*Electrical Engineering
Technology*

The programs in the School of Engineering Technology concentrate on the applications of technology and emphasize the rational processes involved in converting theories and ideas into practical techniques, procedures, and products. Fundamentals are related to current practice, providing a supportive "why" for the practical "how." The study of the humanities and social sciences helps students gain a balanced, well-rounded education.

Engineering technologists work with professional engineers, scientists, medical doctors, supervisors, and craftspersons to develop techniques for converting scientific knowledge and craftsmanship into products. The curriculum helps students understand the scientific principles that govern current technology; apply technology to problem solving; communicate effectively the important implications of technological advances; and acquire the motivation for continued development of technical skills.

The school offers five-year cooperative education programs in mechanical engineering technology, electrical engineering technology, and computer technology—all leading to the degree of Bachelor of Science in Engineering Technology. A firm choice of major may be delayed until the spring quarter of the freshman year.

For transfer students, the school offers a three-year Bachelor of Science degree program with a major in aerospace maintenance engineering technology.

The electrical and mechanical engineering technology baccalaureate day programs and the part-time baccalaureate programs in mechanical, mechanical-structural, and electrical engineering technology are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC/ABET). The part-time program leading to an Associate of Science in engineering degree with majors in electrical and mechanical engineering technology are also accredited by TAC/ABET.

Part-time Evening and Weekend Programs

The part-time programs include courses and degree programs leading to the Associate in Engineering (AE), the Associate in Science (AS), and the Bachelor of Science in Engineering Technology (BSET). The AE degree may be earned in computer technology and in environmental, structural, survey and highway, electrical, and mechanical engineering technology. The AS degree may be earned in telecommunications.

Students may also earn the BSET in computer technology, mechanical, electrical, mechanical-structural, or manufacturing engineering technology. A degree in aerospace maintenance engineering technology is available for transfer students who have completed an airframe and power plant curriculum.

For more information on part-time programs, contact Northeastern University, School of Engineering Technology, 120 Snell Engineering Center, Boston, MA 02115; or call 617-373-2500 (voice), 617-373-8526 (TTY), or 617-373-2501 (FAX).

Class Entrance Requirements

The minimum overall quality-point averages listed are required for students to advance to the next rank and to graduate.

Sophomore	1.4
Middler	1.6
Junior	1.8
Senior	2.0
To graduate	2.0

A cumulative quality-point average of 2.0 or better in major courses is required for graduation. Students are expected to carry the normal prescribed curriculum for the program. Details on criteria for academic probation and suspension are available at 120 Snell Engineering Center.

Graduation Requirement

Students transferring from another college or university are not eligible to receive the degree until they have completed at least one academic year at Northeastern immediately preceding their graduation.

For more information about programs and requirements, refer to the School of Engineering Technology bulletin, available at 120 Snell Engineering Center.

Aerospace Maintenance Engineering Technology

For transfer students the school offers a three-year Bachelor of Science in Engineering Technology degree with a major in aerospace maintenance engineering technology. This program, designed in conjunction with East Coast Aero Technical School, is for students who have successfully completed a program in aircraft and power-plant mechanics or similar technician programs.

To enter the program, students must pass college algebra, precalculus, calculus 1, and chemistry. During their three years of study, students participate in the cooperative education program.

These students have in their possession various federal licenses and qualify for exceptional cooperative education experiences with a number of aerospace firms involved with national defense and space exploration. They are especially sought after by co-op employers dealing with airframe integrity and power plant configuration.

Graduates of this program are prepared to pursue technical, support, or management positions in the aircraft industry. They may also become members of engineering teams in spacecraft or aircraft component manufacturing. Other graduates of the program may assume design/applications positions in either civilian or military aerospace markets.

Bachelor of Science Curriculum

Quarter 1	ENG 1110, Freshman English 1; GET 1170, Engineering Graphics 1; MTH 1194, Calculus 2; PHY 1191, Physics 1; and PHY 1196, Physics Lab 1.
Quarter 2	ENG 1111, Freshman English 2; GET 1100, Computer Programming for Engineering Technology; PHY 1192, Physics 2; PHY 1197, Physics Lab 2; and one social science/humanities elective.
Quarter 3	GET 1171, Engineering Graphics 2; MET 1380, Materials A; MTH 1195, Calculus 3; PHY 1193, Physics 3; and PHY 1198, Physics Lab 3.
Quarter 4	ECN 1115, Principles of Macroeconomics; EET 1320, Electricity and Electronics 1; MET 1301, Mechanics A; CMN 1115, Foundations of Communication; and one social science/humanities elective.
Quarter 5	ENG 1125, Technical Writing; MET 1302, Mechanics B; MET 1314, Stress Analysis A; and one social science/humanities elective.
Quarter 6	MET 1340, Thermodynamics A; MET 1370, Fluid Mechanics A; MET 1390, Measurement and Analysis Lab; MET 1481, Materials B; and one technical elective.
Quarter 7	MET 1341, Thermodynamics B; MET 1391, Technology Lab A; one technical elective; and two social science/humanities electives.

Computer Technology

Nonna K. Lehmkuhl, MEd, MS, *Coordinator for Computer Technology*

Computer technology's major functions include programming the computer for engineering, scientific, and business applications; designing, engineering, and testing computers; and interfacing computers with various types of equipment to enhance automation.

The computer technology program provides degree candidates with both academic and technical learning experience relevant to the hardware and software systems currently used in industry. Students also choose technical electives in their area of interest. High-level theory courses enable students to continue their educational and professional development beyond the baccalaureate level. Some students go on to pursue master's degrees in either business administration or information systems.

A typical sophomore's cooperative education responsibilities might include setting up and configuring various computer platforms, installing software packages, providing phone support for techni-

cal inquiries, and performing elementary network troubleshooting and some software research. Other typical positions explore the various aspects of manufacturing processes, including assembly and quality assurance.

As seniors, typical students have progressed to more sophisticated and challenging assignments. They may be assigned the responsibility of maintaining entire software applications as well as the databases for these programs, or they may be asked to convert old versions of application scripts to conform to new coding principles. Other assignments may include providing advanced technical software and hardware support for end users both on and off site.

Graduates of this program are equipped to play important roles on engineering support teams that implement engineering design projects. They also work closely with engineers as members of research and production teams.

Bachelor of Science Curriculum

Quarter 1	ENG 1110, Freshman English 1; GET 1170, Engineering Graphics 1; MTH 1191, College Algebra; PHY 1191, Physics 1; and PHY 1196, Physics 1 Lab.
Quarter 2	ENG 1111, Freshman English 2; GET 1100, Computer Programming for Engineering Technology; MTH 1192, Pre-Calculus; PHY 1192, Physics 2; and PHY 1197, Physics 2 Lab.
Quarter 3	CT 1150, Computer Organization; MTH 1193, Calculus 1; PHY 1193, Physics 3; PHY 1198, Physics Lab 3; and CMN 1115, Foundations of Communication.
Quarter 4	CT 1311, Programming in C Language; ECN 1115, Principles of Macroeconomics; EET 1151, Circuit Analysis 1; and MTH 1194, Calculus 2.
Quarter 5	CT 1315, FORTRAN Lab; CT 1330, Data Structures; EET 1152, Circuit Analysis 2; MTH 1195, Calculus 3; and one social science/humanities elective.
Quarter 6	CT 1335, Numerical Methods; CT 1340, Software Engineering; CT 1345, Assembly Language; and EET 1311, Electronics 1.
Quarter 7	ENG 1125, Technical Writing; CT 1368, Semiconductor Logic; CT 1374, Introduction to CPU Hardware; and CT 1381, Operating Systems.
Quarter 8	CT 1369, Computer Logic; CT 1375, CPU Hardware Architecture; one computer technology elective; and one social science/humanities elective.
Quarter 9	CT 1355, Microprocessor Peripheral Hardware; CT 1380, Data Communication Methods; one computer technology elective; and one social science/humanities elective.
Quarter 10	CT 1356, Complex Peripheral Hardware; CT 1360, Industry Software; one computer technology elective; and one social science/humanities elective.
Quarter 11	CT 1351, Advanced Computer Organization; CT 1365, Industry Hardware; one technical elective; and one social science/humanities elective.

Electrical Engineering Technology

Ronald E. Scott, ScD, PE, *Coordinator for Electrical Engineering Technology*

The focus of electrical engineering technology is the design and operation of equipment and systems related to power, communications, data processing, and electrical control. Its major functions include generating, transmitting, and distributing electrical energy for light and power purposes; developing and producing equipment for telephone, radio, television, radar, and communication; designing and constructing data-processing systems and analog or digital computers; and applying electrical and electronic devices in the control of processes and manufacturing.

The program in electrical engineering technology offers theory courses at the upper end of the technology spectrum, and students may take technical electives in areas that interest them.

A sophomore may be given the cooperative education assignment of creating and editing electrical blueprints, doing shell drawings, or providing ductwork drawings along with the appropriate heat loading calculations for companies engaged in electrical construction. Other entry positions include assembly, bread boarding, inspection, and quality assurance.

Seniors typically have progressed to positions of much greater responsibility, such as installing and maintaining computer network systems, maintaining on-line base maps for public utility systems, and coordinating architectural and electrical plans with construction companies and suppliers. Students have also had co-op positions in consulting engineering firms as analysts, telemarketers in sales engineering, and environmental safety compliance officers.

Bachelor of Science Curriculum

Quarter 1	ENG 1110, Freshman English 1; GET 1170, Engineering Graphics 1; MTH 1191, College Algebra; PHY 1191, Physics 1; and PHY 1196, Physics Lab 1.
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Quarter 2	ENG 1111, Freshman English 2; GET 1100, Computer Programming for Engineering Technology; MTH 1192, Pre-Calculus; PHY 1192, Physics 2; and PHY 1197, Physics Lab 2.
Quarter 3	GET 1171, Engineering Graphics 2; MTH 1193, Calculus 1; PHY 1193, Physics 3; PHY 1198, Physics Lab 3; and CMN 1115, Foundations of Communication.
Quarter 4	ECN 1115, Principles of Macroeconomics; EET 1151, Circuit Analysis 1; MTH 1194, Calculus 2; and one social science/humanities elective.
Quarter 5	EET 1123, Circuits Lab 1; EET 1152, Circuit Analysis 2; MET 1319, Mechanics; MTH 1195, Calculus 3; and one social science/humanities elective.
Quarter 6	EET 1125, Circuits Lab 2; EET 1311, Electronics 1; EET 1353, Circuit Analysis 3; EET 1360, Engineering Analysis 1; and ENG 1125, Technical Writing.
Quarter 7	EET 1310, Electrical Measurement; EET 1312, Electronics 2; EET 1323, Electronics Lab; and EET 1354, Circuit Analysis 4.
Quarter 8	EET 1313, Electronics 3; EET 1327, Advanced Electronics Lab 1; EET 1330, Energy Conversion; one technical elective; and one social science/humanities elective.
Quarter 9	EET 1314, Pulse and Digital 1; EET 1328, Advanced Electronics Lab 2; EET 1337, Distributed Systems; one technical elective; and one social science/humanities elective.
Quarter 10	EET 1329, Advanced Electronics Lab 3; EET 1370, Digital Computers 1; EET 1377, Control Engineering 1; one technical elective; and one open elective.
Quarter 11	EET 1371, Digital Computers 2; EET 1378, Control Engineering 2; one technical elective; and one social science/humanities elective.

Mechanical Engineering Technology

George F. Kent, MS, PE, *Coordinator for Mechanical Engineering Technology*

As a technical field that deals with the use of machinery to harness power resources and perform useful work, mechanical engineering technology focuses on static forces, motion, and the kinetics of devices activated by hydraulic, electrical, mechanical, or thermodynamic forces.

Mechanical engineering technologists design and install machinery ranging from pocket watches to the largest energy-producing facilities. They help develop and produce engines and transport equipment such as automobiles, aircraft, ships, and railway cars. They also help construct and operate furnaces, boilers, and heating and air-conditioning equipment.

Students in mechanical engineering technology apply the principles of science and mathematics to their chosen fields and convert theories into practical techniques and processes. They learn how to communicate technical information effectively so they may become integral members of an engineer-technologist-technician design and operations team.

Sophomore mechanical engineering technology majors generally are referred to cooperative education positions such as technicians in facility or plant engineering departments, quality assurance positions in light and heavy manufacturing, and prototype development and design teams. A sophomore often will be given the responsibility of drawing mechanical designs and blueprints using various CAD software.

As seniors, these students have progressed to highly responsible positions in manufacturing and production, such as design and test technicians and field service engineers.

Bachelor of Science Curriculum

Quarter 1	ENG 1110, Freshman English 1; GET 1100, Computer Programming for Engineering Technology; GET 1170, Engineering Graphics 1; MTH 1191, College Algebra; PHY 1191, Physics 1; and PHY 1196, Physics 1 Lab.
Quarter 2	ENG 1111, Freshman English 2; GET 1100, Computer Programming for Engineering Technology or GET 1170, Engineering Graphics 1; MTH 1192, Pre-Calculus; PHY 1192, Physics 2; and PHY 1197, Physics 2 Lab.
Quarter 3	GET 1171, Engineering Graphics 2; MTH 1193, Calculus 1; PHY 1193, Physics 3; PHY 1198, Physics Lab 3; and CMN 1115, Foundations of Communication.
Quarter 4	EET 1320, Electricity and Electronics; GET 1364, Kinematics; MET 1301, Mechanics A; and MTH 1194, Calculus 2.
Quarter 5	CHM 1130, Fundamentals of Chemistry; CHM 1138, General Chemistry Lab; MET 1302, Mechanics B; MET 1314, Stress Analysis A; and MTH 1195, Calculus 3.

Quarter 6	ENG 1125, Technical Writing 1; MET 1303, Mechanics C; MET 1315, Stress Analysis B; MET 1340, Thermodynamics A; and MET 1390, Measurement and Analysis Lab.
Quarter 7	ECN 1115, Principles of Macroeconomics; MET 1341, Thermodynamics B; MET 1370, Fluid Mechanics A; MET 1380, Materials A; and MET 1391, Technology Lab A.
Quarter 8	MET 1330, Mechanical Design A; MET 1371, Fluid Mechanics B; MET 1392, Technology Lab B; MET 1396, Machine Shop or IIS ____ elective; and one social science/humanities elective.
Quarter 9	MET 1331, Mechanical Design B; MET 1343, Heat Transfer; MET 1393, Technology Lab C; one technical elective; and one social science/humanities elective.
Quarter 10	MET 1366, Engineering Economy; MET 1394, Technology Lab D; MET 1481, Materials B or MET 1416, Stress Analysis C; one technical elective; and one social science/humanities elective.
Quarter 11	MET 1343, Heat Transfer; MET 1395, Technology Lab E; one open elective; and one social science/humanities elective.

College of Nursing

Eileen H. Zungolo, MED, EdD, RN, *Dean*

Carole Shea, MS, PhD, RN, *Associate Dean and Director of Graduate School*

Janet A. Carroll, MS, RN, *Assistant Dean of Administration*

Christine Letzeiser, MS, RN, *Assistant Dean of Student Affairs*

Associate Professors

Jane F. Aroian, MSN, EdD, RN

Olivia M. Breton, MEd, RN

Elaine L. Capozzoli, MA, PhD, RN

Margery M. Chisholm, MS, EdD, RN

Ellen T. Daly, MS, EdD, RN

M. Paula Fellows, MS, RN

Ann C. Galligan, MS, CAGS, EdD, RN

Jean P. Gilbert, MS, EdD, RN

Dorett Hope, MSED, EdD

M. Marcia Lynch, MSN, DNSc, RN

Susan C. Marchessault, MSN, RN

Geraldine A. Medici, MS, RN

Patricia Mesurvey, MS, PhD, RN

Marilyn M. Smith, MS, MBA, RN

Nancy L. Walden, MSN, RN

Mary E. Wilcox, MS, RN

M. Delaine Williamson, MS, MPH, RD

Assistant Professors

Michelle Beauchesne, MS, DNSc, RN

Nancy N. Carr, MS, RN

Mary Anne Gauthier, MSN, EdD, RN

Elizabeth M. Howard, MS, PhD, RN

Joan M. Jacobson, MS, PhD, RN

Barbara Kelley, MS, MPS, EdD, RN

Peggy Matteson, MS, PhD, RN

Kathleen Miller, EdD, MS

Donna Newby, MSN, PhD, RN

Carol Williams, MS, DNSc, RN

Lecturers

Anne Bateman, MSN, RN

Margaret McAllister, MA, SpCIN, RN

Elaine Small, MS, RN

Visiting Professor

Margaret Mahoney, PhD, MS, RN

The college offers a Bachelor of Science program designed to prepare students to become professional nurses for practice in a variety of health-care settings, such as hospitals, neighborhood health centers, schools, and homes. The College of Nursing aims to provide all students—including those with diverse backgrounds and changing career goals—with a broadly based education and the stimulus for ongoing personal and professional growth.

The curriculum offers instruction in nursing theory and research, the humanities, and the biological, physical, and social sciences. More than 50 percent of the coursework is in the sciences and humanities.

In addition to completing academic coursework, students must meet the cooperative education requirement, which gives students the opportunity to integrate the theory and practice of nursing in selected settings. Through thirty health-care agencies in Greater Boston, including community and institutional settings, students gain experience in providing nursing care to clients and families.

As primary health-care providers, nurses engage in a range of activities promoting and teaching health and coordinating care in every sector of the health-care system. Nurses have major roles in wellness and health promotion, acute care, long-term care for the chronically ill, and community health care.

The baccalaureate nursing program provides the educational background needed for graduate study in nursing specialties. Successful completion of the baccalaureate program allows its graduates to take the National Council Licensing Examination (NCLEX-RN) to become registered nurses.

The program is accredited by the National League for Nursing and approved by the Board of Registration in Nursing of the Commonwealth of Massachusetts. Accreditation and approval indicate that the program meets educational standards for faculty, curriculum design, student quality, and overall University support. The college subscribes to the standards established by the American Association of Colleges of Nursing, of which it is a member.

The requirements listed are for the Class of 1995 and beyond. Students completing the nursing program prior to 1995 are strongly encouraged to meet these academic standards. The minimum overall quality-point averages (QPA) listed are required at year's end for students to advance to the next level or to graduate.

Sophomore	1.6
Middler	1.8
Junior	2.0
Senior	2.0
To graduate	2.0

Class Entrance Requirements

These averages reflect the minimum requirements for advancement; the faculty of the college highly recommends that students achieve higher grades in order to avoid academic difficulties as they progress through the program.

In addition, a grade of 2.0 or better is required in each nursing course. During the first year, nursing students must achieve a grade of C or better in BIO 1152 and BIO 1153 and a grade of C– or better in BIO 1115, CHM 1111, and CHM 1112. The QPA for these science courses must be 1.8 before a student can enter the sophomore year. Other standards for progress, such as the minimum science QPA for the sophomore year, are published in the *College of Nursing Undergraduate Student Handbook* available at 211 Robinson Hall.

Special Requirements

Prior to entering, every student must have a physical examination, including a rubella titre and immunization for measles, mumps, rubella, and tetanus. Hepatitis B and a chicken pox titre are required prior to clinical experience. Each year thereafter, the student must receive a health clearance. All students must carry malpractice insurance. Arrangements for this insurance are made by the University. Students in the College of Nursing are required to wear the approved school uniform in clinical laboratory areas during academic quarters. A modification of the uniform is worn during cooperative education work experiences. All students assigned to a clinical nursing course must be certified in cardiopulmonary resuscitation (CPR); annual recertification is required. Students enrolled in the Community Health Nursing course must have access to a car to travel to assigned agencies.

Graduation Requirements

The College of Nursing reserves the right to amend courses, the program, and degree requirements to fulfill its responsibility as a professional program leading to licensure. Degree candidates must complete all prescribed courses, a minimum of 177 quarter hours of credit. An overall science and nursing QPA of 2.0, with a C in all nursing courses and specified minimal grades as set forth in the policies of the college are required. Degree requirements are based upon the year of graduation, determined by the date of entry or re-entry into the College of Nursing. Degree requirements and the year of graduation for a student who does not make normal academic progress for more than two quarters will be subject to review and possible change. Candidates must meet the requirements of the Department of Cooperative Education and University residency requirements.

Transfer Student Track

The College of Nursing welcomes transfer students and students planning a career change who have a degree in another field, or who have completed a minimum of 45 quarter hours or transfer credits that are appropriate to curriculum requirements; these credits must include two chemistry courses and two anatomy and physiology courses and reflect a minimum overall QPA of 2.5. Students are accepted into this track for the fall quarter only. Once accepted, the transfer student follows a fixed curriculum plan that includes a minimum of three quarters of cooperative education experience. Students may complete baccalaureate program requirements in approximately two years and nine months.

RN to BSN Option

The college accepts registered nurses who wish to complete requirements for a Bachelor of Science in Nursing degree for either a full-time College of Nursing day option or the part-time University College evening section. The length of the program varies, depending on the individual's previous educational experience and ability to achieve advanced placement through selected methods. The program accepts either the Act Proficiency Examination Program (ACT PEP) or the National League for Nursing Mobility Profile II Examination for advanced placement.

Bachelor of Science Curriculum

Quarter 1	BIO 1115, Introduction to Human Biology; ENG 1110, Freshman English 1; MTH 1106, Fundamentals of Mathematics; and NUR 1100, Introduction to Professional Nursing and the Health System.
Quarter 2	BIO 1152, Integrated Anatomy and Physiology 1; CHM 1111, General Chemistry 1; ENG 1111, Freshman English 2; and NUR 1101, Introduction to the Theoretical Basis for Nursing Practice.
Quarter 3	BIO 1153, Integrated Anatomy and Physiology 2; CHM 1112, General Chemistry 2; NUR 1102, Introduction to Human Nutrition; and SOC 1100, Introduction to Sociology.
Quarter 4	BIO 1120, Basic Microbiology; BIO 1154, Integrated Anatomy and Physiology 3; NUR 1200, Nursing Basic Human Needs 1; and PSY 1111, Foundations of Psychology 1.
Quarter 5	NUR 1201, Nursing Basic Human Needs 2; NUR 1202, Introduction to Pathophysiological Concepts for Clinical Nursing; PSY 1112, Foundations of Psychology 2; and one computer elective.

Quarter 6	NUR 1300, Nursing Common Problems; NUR 1302, Transition (RN only); PCL 1305, Pharmacodynamics; PSY 1241, Human Behavioral Development 1; and SOA 1100, Peoples and Cultures.
Quarter 7	ENG 1350, Intermediate Writing; NUR 1301, Psychiatric/Mental Health Nursing; and PSY 1242, Human Behavioral Development 2.
Quarter 8	NUR 1401, Medical-Surgical Nursing; one humanities elective; and one open elective.
Quarter 9	NUR 1400, Maternal and Child Nursing; one humanities elective; and one history elective.
Quarter 10	NUR 1500, Community Health Nursing and two open electives.
Quarter 11	NUR 1502, Introduction to Research in Nursing; NUR 1504, Contemporary Issues in Nursing; NUR 1505, Introduction to Leadership and Management of Patient Care; and one open elective (optional).

Electives

The College of Nursing offers electives that enable students to satisfy their personal objectives. They include Advanced Clinical Care; Health Assessment; Independent Study; Life Crisis Analysis and Response; The Nurse Entrepreneur; International Health Care Practices; International Health Care Delivery; International Health Policy Issues; and Women's Health Choices and Decisions.

Alternative Freshman-Year Program

The Alternative Freshman-Year (AFY) Program is designed for students who need help in strengthening their basic study skills and abilities while they take the required freshman-year coursework in English, mathematics, and social sciences.

The program carefully monitors student participation in small, homogenous classes that are based on supportive group-learning procedures. The program also provides participants with extensive help in clarifying their academic and career goals.

Through the combination of a carefully prescribed curriculum and the attention of faculty whose expertise is in developmental education, students follow a program that fits their individual needs. These same faculty teach the majority of the courses taken by AFY students, provide advice and support, and participate in a "House Plan" in which faculty members share information on each student's progress.

The program's flexibility not only helps AFY students gain confidence in their ability to do college-level work, but also allows them to consider several different areas of study before selecting a major. Students in this program are considered regular degree candidates with an undeclared major and enter their desired majors as sophomores.

In preparation for gaining sophomore status, AFY students follow one of three curriculum tracks: business, nonbusiness (including undecided) and health/science. With the exception of the health/science track, students may change either their intended major or curriculum track through the winter quarter of the freshman year without falling behind.

Students in the program have access to all physical education facilities and extracurricular programs. Alternative freshman-year students are encouraged to make extensive use of the Academic Assistance Center and the math and writing centers. Students are frequently referred to the Learning Resources Center. The Counseling Center is available for personal and academic counseling as well as for vocational testing and counseling.

Class Entrance Requirements

To qualify for sophomore status in the College of Arts and Sciences, the College of Business Administration, and the College of Criminal Justice, AFY students must earn a quality-point average of 1.4 or higher and successfully complete forty-four programmed credits, as well as required courses. The College of Business Administration requires students to earn a 1.8 in the four core courses: ECS 4601, ENG 4014, MGT 4110, and MTH 1113.

Alternative freshman-year students may also qualify, on a space-available basis, for all majors in the Bouvé College of Pharmacy and Health Sciences with the exception of Physical Therapy, by following the AFY health/science curriculum track. Such students must complete fifty-nine programmed credits over four quarters, including three chemistry, two biology and two advanced math courses with a QPA of 3.0 or higher, with no grade below C in the science courses. Repeaters in the Alternative freshman-year program are not eligible for any majors in the Bouvé College.

AFY students who do not meet the requirements for sophomore status in their intended majors are classified as "repeaters" until they meet quality-point average and credit requirements for completing the freshman year in their particular program.

Business

Quarter 1 ED 4003, Integrated Language Skills Development A; ENG 4013, Fundamentals of English 1; HST 4110, History of Civilization A *or* ECN 4601, Economics 1; and MTH 1000, Math Preliminaries 1.

Quarter 2 ED 4004, Integrated Language Skills Development B; ENG 4014, Fundamentals of English 2; HST 4110, History of Civilization A *or* MGT 4110, Survey of Business and Management; and MTH 1010, Math Preliminaries 2.

Quarter 3 ECN 4601, Economics 1 *or* 2; MGT 4110, Survey of Business and Management; HST 4111, History of Civilization B; MTH 1113, Math for Business; and a directed elective.

Arts and Sciences, Criminal Justice, or Education

Quarter 1 ED 4003, Integrated Language Skills Development A; ENG 4013, Fundamentals of English 1; MTH 1000, Math Preliminaries 1; and SOC 4010, Principles of Sociology 1 *or* HST 4110, History of Civilization A.

Quarter 2 ED 4004, Integrated Language Skills Development B; ENG 4014, Fundamentals of English 2; HST 4110, History of Civilization A; and MTH 1010, Math Preliminaries 2 *or* SOC 4011, Principles of Sociology 2.

Health Sciences

Quarter 3	ENG 1111, Freshman English 2 <i>or</i> a directed elective; HST 4111, History of Civilization B; POL 4106, Introduction to Politics, an elective; and SOC 4011, Principles of Sociology 2; <i>or</i> an elective.
Quarter 1	CHM 1110, General Chemistry Preliminaries; ED 4001, Integrated Language Skills Development 1; ENG 4013, Fundamentals of English 1; and MTH 1010, Math Preliminaries 2.
Quarter 2	CHM 1111, General Chemistry 1; ED 4002, Integrated Language Skills Development 2; ENG 4014, Fundamentals of English 2; and MTH 1106, Fundamentals of Mathematics.
Quarter 3	BIO 1140, Basic Animal Biology 1; CHM 1112, General Chemistry 2 <i>or</i> CHM 1122, General Chemistry 2A; ENG 1111, Freshman English 2 <i>or</i> a directed elective; and a directed elective.
Quarter 4	BIO 1141, Basic Animal Biology 2; MTH 1107, Functions and Basic Calculus; and a directed elective.

In each curriculum, students will be placed into one of three mathematics courses based on testing results.

Course Descriptions

Arts and Sciences

Please note some courses in the College of Arts and Sciences are duplicated in different departments or colleges, or within a department. You may not receive credit for two such courses. If you have a question about whether one course does overlap with another, please consult the departments involved and the Office of the Dean before taking the course.

Numbers in parentheses within course descriptions refer to core curriculum categories listed on page 31.

African-American Studies

AFR 1100 Introduction to African-American Studies 4 QH

Explores several of the possible historical, sociological, cultural, and political avenues of study in the broad interdisciplinary spectrum of African-American studies. Provides an introductory overview of the field and will offer an opportunity to identify areas for more specific focus.

AFR 1131 African-American History I 4 QH

Covers the development of black America from the period of slavery through Reconstruction, with emphasis on the historical links between Africa and America and the impact on black development in the United States. Same as HST 1525. (III)

AFR 1132 African-American History 2 4 QH

Examines the development of black America from Reconstruction to the present, and the effects of events in the United States and world history on the development of black America. Emphasizes contemporary issues and how these issues can be seen through a historical perspective. Same as HST 1526. *Prereq.* AFR 1131 or permission of instructor.

AFR 1133 History of Blacks in the Media and the Press 4 QH

Offers a historical and visual examination of the development of the African-American experience in the American mass media and press. Analyzes contemporary and historical literature, films, and people with respect to history, racism, images, psychology, and social movements. Newspapers, film, television, and radio are prime focal points, and are used to help form strategies for the future of black Americans.

AFR 1141 Education Issues and Minority Communities I 4 QH

Focuses on some of the important issues in today's urban elementary and secondary education systems. The analysis will look at the historical development of these issues, and students will be encouraged to think about and discuss the issues' future significance.

AFR 1151 Survey of African-American Art 4 QH

Black art, like black literature, has always been an important aesthetic social statement by the African-American artist. This course offers a historical and critical examination of African-American art from the nineteenth century to the present, with special emphasis on the effects of European and African art styles on the black artist in America.

AFR 1153 Survey of African-American Music 4 QH

Black music has evolved in fascinating ways over the past hundred years. Topics include the impact of African rhythm on black

music, the New Orleans coalescence, regional development, ragtime, the emergence of large bands, the harmonic revolution of the forties, bebop, the 1960s avant-garde, and subsequent developments. Some analysis of specific jazz phenomena is included. Same as MUS 1104.

AFR 1155 Foundations of Black Culture 4 QH

Studies music, literature, visual and performing arts, and other cultural and artistic traditions as they have evolved among African, African-American, and Caribbean peoples.

AFR 1156 Music of Africa 4 QH

The music of Africa is as varied as that continent's many linguistic and tribal identities. This course will provide a broad survey of the musical traditions of Africa with respect to their historical, social, and cultural backgrounds. Musical organization, musical practice, and aspects of style will all be discussed in light of possible contributions to contemporary African-American music. Same as MUS 1181.

AFR 1161 Economic Issues in Minority Communities 4 QH

Minority lifestyles, perspectives, self-images and social position in the urban community are all affected by economic factors, especially those specific to the minority poor. Students have the opportunity to examine these issues, particularly in terms of the application of basic economic theories to the economic realities of minority communities. Same as ECN 1170. (VI)

AFR 1171 Contemporary Black Politics 4 QH

The modern black political movements were inspired by a full-scale evolution of black political thought in America. Analysis of this evolution examines socio-political contests that have served as catalysts to these modern movements.

AFR 1191 Early African Civilization 4 QH

Studies the ancient empires of Africa, especially Ghana, Songhai, Mali, Zimbabwe, the city states of East Africa, and also the Congo Kingdom. Includes Ethiopian as well as Egyptian history and controversies to 1800. Same as HST 1620.

AFR 1193 Africa Today 4 QH

With increasing numbers of nations striving for economic and political control in Africa, and with imperialist and colonial ideas remaining in the living memory of Africans, Africa presents a complex political and social picture to the rest of the world. This course examines some of the salient features of black art, politics, and identity in Africa.

AFR 1195 Identity and Nationalism in Africa 4 QH

How have centuries of imperialism, the struggle for national unity, and the continuing problems of racism and rivalry between factions affected the present identities and nationalist movements in Africa? This course explores problems peculiar to Africa and to any group of nations struggling against colonial ideas. Tribalism and the effects of European colonial partition on African identity are discussed.

AFR 1196 The Black Experience in the Caribbean 4 QH

Offers a descriptive and interpretive analysis of the growth of the modern black community in the Caribbean. Although the focus will be on the contemporary period, the course will examine that

period in the context of colonialism and slavery in the Americas. Important racial, social, political, economic, and religious issues will be addressed.

AFR 1197 Modern African Civilization 4 QH

Explores African history and culture from 1800 to the present era. Emphasis will be placed on the relationship between Europe and Africa, the circumstances surrounding the imperialist partition of Africa, and the decolonization process. This course is the same as HST 1621. (IV)

AFR 1211 African-Americans in Science, Technology, and Medicine 4 QH

Studies the contributions that African-Americans have made to the development of science and technology in America. It examines the cultural and social factors that have encouraged blacks to work in the fields of science (biology, chemistry, physics) and technology (engineering and medicine). Certification of blacks within the American scientific community and the availability of science to the past and contemporary African-American communities are also explored. Readings, discussions, individual research topics, and interviews with black scientists, inventors/engineers, and doctors are used to develop the basic course material.

AFR 1220 The Black Novel 4 QH

The black novelist belongs to a unique literary group in the history of American fiction. Special attention is given to Chesnutt, Toomer, Wright, Ellison, and contemporary novelists, and to their different perceptions of the black experience in America.

AFR 1235 Black History of Boston 4 QH

Examines the social, economic, political, and educational history of Boston's black community in the nineteenth and twentieth centuries. The development of the black community and its institutions is a major focus, and students are encouraged to study the past in an attempt to understand the present and interpret the future. Research data include participant observation, oral history, interviews, and primary and secondary source materials.

AFR 1240 Contemporary Issues in Black Society 4 QH

Introduces the various issues and problems that confront black Americans, including some of the realities of the social, political, and economic problems of contemporary black experience. Students are asked to assess the validity of specific social theories in relation to the black experience.

AFR 1241 The Black Family 4 QH

How does the black family function, both interpersonally and as a social unit? Anthropological and sociological theories deal with variations in family structure and the function of the black family in black society. The effects of slavery and colonization on the black family structure and functions are also explored. A side issue is a discussion of some of the differences and similarities between African, African-American, and African-Caribbean families.

AFR 1248 Race Relations in America 4 QH

Examines the interrelations of ethnic, cultural, and minority groups in the United States. Focus is on the nature of racial conflicts, discrimination, reverse discrimination, personal and institutional racism, and racial and ethnic stereotyping. Discussion considers avenues of improvement in attitude awareness and change.

AFR 1251 Survey of Black Theater and Drama 4 QH

Theater in America has been an important reflector of the national experience, and black theater, especially in recent years, has served the same purpose for the black community. The course focuses on the development of black drama during the nineteenth and twentieth centuries, with emphasis on modern developments and their political and cultural significance.

AFR 1261 The Economics of Urban Poverty 4 QH

Like most Americans and people from around the world, blacks migrated to central cities in America to better their economic conditions. However, unlike other migrants to urban centers, they were not assimilated into the social/economic mainstream, and there is evidence of flagrant job, housing, and educational discrimination against them even during periods of affluence. During recession or depression, their problems were compounded. Students have the opportunity to survey the above events from an economic framework.

AFR 1280 Black Psychological Identity 4 QH

So much is said of stereotyping in news, on television programs, and in literature. The shaping of the black identity over three centuries in America is a complicated and perhaps even elusive problem. This course will look at the impact of slavery, racism, war, and poverty on the evolution of the black identity in America.

AFR 1294 Third World Political Relations 4 QH

Offers a comparative regional analysis of the political systems of third world nations of Africa, Asia, Latin America, and the Caribbean. Emphasis is on development strategies; problems of development, including national identity, political socialization and participation, national defense, and urbanization; and the positions of third world nations in the international community.

AFR 1295 Politics of South Africa 4 QH

Examines contemporary political developments in South Africa. Focuses on the historical development of the system of racism called apartheid and the liberation movements, and the struggle for a democratic South Africa. Explores the role of the United Nations, the Organization of African Unity, the United States, and other international organizations and countries.

AFR 1297 Caribbean History 4 QH

Analyzes the development of the Caribbean from slavery to the present. The focus will be on the period 1918-1962 especially, and emphasis will be on the historical analysis of the relationship of the Caribbean with the United States and black Americans. Same as HST 1605.

AFR 1300, AFR 1301, AFR 1310, AFR 1311 Directed Study 4 QH each

Directed study offers the ambitious student the opportunity to pursue a special intellectual interest not covered by the department course offerings and to work on this interest with the department faculty member of his/her choice. The faculty member will closely supervise the project and act as adviser for the duration of the quarter.

AFR 1342 Crisis and Conflict in Black Africa 4 QH

Explores contemporary politics in African nations south of the Sahara using films, maps, news clips, discussions, and readings. Studies South Africa, Nigeria, Kenya, and Ethiopia. Examines apartheid, colonialism, Afro-Marxism, chieftaincy, economic development, and Pan-Africanism. Same as POL 1342. (VI)

AFR 1350 Research Seminar**4 QH**

This course is divided into three parts, providing students the opportunity, first, to identify a substantive area of their concern (for example, welfare, political leadership, education) and to define a related problem in a research context; second, to be supervised in designing a research methodology most appropriate for examining the problem area; and third, to conduct extensive research, test the hypothesis, and draw conclusions based on data analysis techniques.

AFR 1355 Directed Study for Senior Thesis**4 QH**

The senior thesis is required of all African-American Studies majors; it offers students the opportunity to prepare a professional research paper under the close supervision of a scholar interested in students' particular research areas. *Prereq.* Permission of instructor.

AFR 1380 Junior/Senior Honors Program**4 QH**

For details contact the honors office.

AFR 1401 History of East Africa**4 QH**

The first section of the course deals with the precolonial period and the problems of the partition of Africa. The second section focuses on the classical colonial period and the transformations of colonial policy after World War II, with particular emphasis on the ambiguity of decolonization and those features of the colonial system that seem to have become a part of the East African social and political environment.

AFR 1403 History of West Africa**4 QH**

The history of West Africa has included the struggle for internal unity, economic development, and social justice. The Pan-Africanist ideology, W.E.B. DuBois's writings, African socialism, and the consolidation of power and leadership are some of the topical objectives in this study of African liberation, particularly the rise of West Africa. Same as HST 1623.

AFR 1405 History of South Africa**4 QH**

Initial attention is directed toward pre-colonial South Africa and the conflict between Africans and the Dutch and English settlers. The course then focuses on the formation and transformation of colonial policy after World War II, with particular emphasis on racism, neo-colonialism, liberation movements, and international involvement in the apartheid system. Same as HST 1625. (VI) *Prereq.* AFR 1491 or permission of instructor.

AFR 1421 African-American Literature 2**4 QH**

Continues AFR 1127. Focuses on principal writers and their major themes. *Prereq.* AFR 1127 or permission of instructor.

AFR 1448 Religion in Black American Society**4 QH**

Black life in America cannot be fully understood without a sense of the importance of religion in the community. This course looks at the impact of religion on social structures, group behaviors, moral codes, and belief patterns in black society. Topics include the church as a social organizer, the role of the black minister in the community, and the variety of black denominations in urban and rural areas.

AFR 1451 Seminar: Creative Expression in Blues and Jazz**4 QH**

Blues and jazz have been among the most far-reaching and original artistic expressions of blacks in America. The course touches on possible African sources of inspiration for the

musical literature of blues and jazz; a more important focus, however, is on blues and jazz as a reflection of African-American life and on the impact these musical forms have had on black self-image and position in American culture.

AFR 1470 Black Political Thought**4 QH**

How do the black people as a unit view the American political system and black people's chances of improving their lot in this country? This course examines black opinions, from the radical to the ultra-conservative, of the United States political system. The focus is historical in context and will address notions of political socialization and the development of black political ideologies.

AFR 1480 Black Man/Black Woman**4 QH**

Sociological and anthropological methods are used to examine black male and female personality development as well as the development of black male and female behavior, self-image, sexual roles, and behavior within both the black and the white communities.

AFR 1500 Topics in African-American Studies**4 QH**

Examines closely topics of interest to students of African-American Studies, including political leadership, intellectual history, cultural and artistic expression, community development, and recent social and economic trends.

AFR 1810, 1811, 1812, 1813 Junior/Senior Honors Project**4 QH each**

For details contact the honors office.

The following courses may be of interest to the student wishing to concentrate in African-American Studies. Descriptions for these courses may be found in the appropriate department listing.

PHL 1100 Introduction to Philosophy**PHL 1140 Social and Political Philosophy****PHL 1243 Existentialism****PHL 1335 Moral Philosophy****POL 1303 Political Behavior****POL 1362 Civil Liberties****POL 1386 International Law****SOA 1345 People in Cities****SOC 1147 Urban Social Problems****SOC 1170 Race and Ethnic Relations****SOC 1310 Class, Power, and Social Change**

American Sign Language—English Interpreting

ASL 1101 American Sign Language 1**4 QH**

Introduces American Sign Language and deaf culture, focusing on frequently used signs, basic rules of grammar, nonmanual aspects of ASL, introductory fingerspelling, and some cultural features of the deaf community.

ASL 1102 American Sign Language 2**4 QH**

Continues basic language and culture study. Offers an opportunity to build receptive and expressive sign vocabulary. Topics include use of the signing space; further use of nonmanual components, including facial expression and body postures. *Prereq.* ASL 1101 or permission of instructor.

ASL 1201 Intermediate American Sign Language 1**4 QH**

Emphasizes further development of receptive and expressive skills, fingerspelling, vocabulary building, grammatical structures; encourages more extensive use of non-manual behaviors, classifiers, body postures, and the signing space. Introduction to regional and ethnic sign variations and political and educational institutions of the deaf community. *Prereq.* ASL 1102 or permission of instructor.

ASL 1202 Intermediate American Sign Language 2**4 QH**

Offers intensive practice involving expressive and receptive skills in story telling and dialogue. Introduces language forms used in ASL poetry and the features of culture as they are displayed in art and the theatre. *Prereq.* ASL 1201 or permission of instructor.

ASL 1211 Deaf Culture**4 QH**

Focuses on the status of deaf people as a linguistic and cultural minority group. Topics include the role of American Sign Language in the deaf community; educational and historical perspectives on deafness; and sociological and cultural make-up of the deaf community. *Prereq.* ASL 1101 or permission of instructor.

ASL 1212 Deaf History**4 QH**

Surveys the history of deaf people in the Western world, with emphasis on the American deaf community, their language, education, and relationship to hearing society.

ASL 1250 Linguistics of American Sign Language**4 QH**

Introduces the basic issues in linguistics through examining the structural properties of American Sign Language and comparing it with other languages having similar properties. Includes phonology (formational properties of signs), morphology (word formation rules, derivation, and inflection, complex verbs, classifiers, verb modulations), semantics (the meaning structure of signs), and syntax (the structure of ASL utterances in terms of old versus new information and the structure of ASL narratives). *Prereq.* ASL 1201 and ENG 1118 or permission of instructor.

ASL 1301 Advanced American Sign Language Proficiency**4 QH**

Emphasizes vocabulary building and mastery of fine points of grammar through rigorous receptive and expressive language activities. Explores a variety of signing styles and registers. Includes student-led discussions, debates, and reports on topics in deaf culture, society, and current affairs. *Prereq.* ASL 1202 or permission of instructor.

ASL 1302 Advanced American Sign Language Proficiency 2**4 QH**

Continues ASL 1301. *Prereq.* ASL 1301 or permission of instructor.

ASL 1401 American Sign Language Literature**4 QH**

Various genres of American Sign Language will be read and discussed in ASL. This course will concentrate on the work of current, recognized narrators in both literary and face to face storytelling traditions, and will also include selected autobiographical sketches, lectures, stories, and letters from the early 1900s by such historical figures as Clerc, Veditz, E.M. Gallaudet,

Hotchkiss, and others. A videotaped research essay in ASL will be required at the end of the course. *Prereq.* ASL 1202 or permission of instructor.

ASL 1500 Introduction to Interpreting**4 QH**

Presents an overview of the interpreting profession: responsibilities, ethics, and aptitudes of interpreters; professional associations; law and business of interpreting; the bilingual and bicultural context; basic translation and interpretation; environment and audience; special populations; freelance versus in-house positions; and evaluation and certification. *Prereq.* or concurrent: ASL 1211 and ASL 1301. *Majors only or permission of instructor.*

ASL 1505 ASL–English Interpreting 1**4 QH**

Presents an overview of theoretical models. Examines the processes of translating and interpreting through practice of requisite skills and process tasks, and by applying skills and theory. *Prereq.* ASL 1302 with a grade of B or better and ASL 1500. *Majors only or permission of instructor.*

ASL 1506 ASL–English Interpreting 2**4 QH**

Continues the study of interpreting, including practice of requisite skills and process tasks of increased complexity. Focuses on consecutive interpreting by applying process skills, contrasting ASL–English linguistics, and contrasting cultural analysis. *Prereq.* ASL 1505 and ASL 1520, both with a grade of B or better. *Majors only or permission of instructor.*

ASL 1507 ASL–English Interpreting 3**4 QH**

Continues the study of interpreting, including practice of requisite skills and process tasks of increased complexity. Focuses on simultaneous interpreting through applying process skills, contrasting group dynamics, and analyzing discourse. *Prereq.* ASL 1506 with a grade of B or better. *Majors only or permission of instructor.*

ASL 1520 Interpreter Role and Ethics**4 QH**

Explores ethical standards and dilemmas in ASL–English interpreting and other professions through discussions, hypothetical situations, and role playing. Includes topics such as culturally objective standards, ethics and professional principles, power relations within groups, and the Registry of Interpreters for the Deaf code of ethics. *Prereq.* ASL 1302 with a grade of B or better and ASL 1500. *Majors only or permission of instructor.*

ASL 1521 Contrastive Analysis**4 QH**

Examines and contrasts the major linguistic features of ASL and English. Introduces, defines, and justifies the standard division of morphology, phonology, syntax, semantics, and register, and compares the various elements of both languages that fall under these divisions. *Prereq.* ASL 1250 and ASL 1302 or permission of instructor.

ASL 1522 Discourse Analysis for Interpreters**4 QH**

Presumes that the sentence is not the largest linguistic unit in all languages, including ASL, and that linguistic structures do not exist in isolation, but rather join together in a communicative process. Explores how discourse, such as conversations and texts, is structured, and emphasizes the discourse strategies of ASL. *Prereq.* ASL 1302 or permission of instructor.

ASL 1801, ASL 1802, ASL 1803, ASL 1804, ASL 1805**4 QH each****Directed Study**

Directed studies offer students an opportunity to go beyond course work of the regular curriculum or to pursue an individual learning project. May include research, practicum, or language development activity.

ASL 1810 Special Topics in Interpreting**4 QH**

Provides students with an overview of interpreting for populations with particular needs and preferences as well as interpreting in settings where specific knowledge bases are required. Populations will rotate and may include elderly, children, minorities, deaf-blind, multihandicapped, visual-gestural, foreign language, emotionally disturbed, and oral deaf persons; settings may include educational, high-tech, and performing arts. *Prereq.* ASL 1505. *Majors only or permission of instructor.*

ASL 1820 Interpreting Practicum 1**4 QH**

Features practical interpreting experience in agencies serving deaf people. Focuses on linguistic and ethical questions and dilemmas in a biweekly seminar format. Requires six hours per week in an agency. *Prereq.* ASL 1505 with a grade of B or better. *Majors only or permission of instructor.*

ASL 1821 Interpreting Practicum 2**4 QH**

Continues ASL 1820. *Prereq.* ASL 1505 with a grade of B or better. *Majors only or permission of instructor.*

Anthropology

SOA 1100 Peoples and Cultures**4 QH**

Surveys concepts in anthropology (the study of culture). Analyzes a range of societies in terms of such sociocultural institutions as kinship, gender relations, economics, politics, and religion. Examines important political and economic processes, such as colonialism and development, affecting cultures around the world.

SOA 1101 Cultural Meaning and Everyday Life**4 QH**

Using anthropological ideas, studies the underlying patterns of meaning that are below the surface of everyday thought and behavior. Examines daily routines, leisure activities, joking and humor, speech patterns, popular culture, current folklore and mythology, nonmonetary economic transactions, kinship and friendship, and religion and ritual.

SOA 1104 Cultures of the World**4 QH**

Explores cultural differences among peoples in societies around the globe and analyzes how diverse cultural patterns can be studied and described. (II)

SOA 1120 Camera on Culture: Visual Anthropology**4 QH**

Explores how cultures are portrayed on film. Examines anthropologists' use of film to gather information and represent other peoples. Also examines how filmmakers from postcolonial societies have addressed the respective cultures, the experience of colonialism, and the nature of film-making and film/video consumption in the third world. When possible, a production experience is included. (IV)

SOA 1125 Stones and Bones: Prehistory in the New World**4 QH**

Surveys the New World prehistoric cultures. Focuses on examining the work of archaeology and ethnohistory in a range of societies in both South and North America. Pays particular attention to social, political, and economic factors and how these work to promote such things as state formation, regional political alignment, and social differentiation. Studies the Incan, Mayan, and Aztec states, as well as the big game hunting traditions of the Plains, the forming communities of the Southwestern United States and Mississippi River area.

SOA 1146 Rural Workers in the Third World**4 QH**

Surveys the lives of rural peoples in the contemporary Third World. Focuses on people's organizing efforts to improve their living and working conditions. Uses case studies from Latin America and China. (IV)

SOA 1155 Individual and Culture**4 QH**

Explores the ways in which individuals are shaped by society and the ways in which they can effect change.

SOA 1160 Sex, Sex Roles, and Family**4 QH**

Examines popular and scientific notions about sex, gender relations, family, and kinship. Examines why our images of family, masculinity, and femininity are not universal by analyzing the patterns of sex roles, sexual practices, and kinship in other cultures. Discusses how and why relations between men and women change during times of socioeconomic and political change.

SOA 1185 War and Aggression**4 QH**

Using anthropological investigations, critically evaluates the assumption that aggression is part of human nature and linked to sex differences. Discusses cross-cultural variation in violent behavior and warfare in the context of wider political and economic processes. Analyzes the widespread belief in innate masculine aggression as it relates to contemporary societal violence and militarism.

SOA 1220 Culture and Mental Illness**4 QH**

Discusses and analyzes the nature and meaning of culture, the role of culture in personality formation, culture and anxiety, anthropological approaches to the "normal" and the "abnormal," and the question, "Is mental illness psychological fact or cultural fiction?"

SOA 1275 Musical Culture: Notes in the Modern World**4 QH**

The ongoing social, political, and cultural dialogues reflect the people who compose, play, and listen to music. This course explores issues of class, ethnicity, gender, sexuality, and age in the cross-cultural context of music as expressed in performances, recordings, videos, literary, and ethnographic materials. The course will also examine the social production and consumption of music. Expects students to conduct a series of field exercises.

SOA 1301 Human Origins**4 QH**

Offers an intensive look at the data on fossil remains and contemporary primates, which are essential for an understanding of human physical and behavioral evolution. Efforts are made to bring the student into direct contact with primary materials. (II)

SOA 1303 Sexuality and Culture**4 QH**

Examines sexuality in a cross-cultural perspective including issues of sexual identity, the relationship of sexuality to the life

cycle, sexual ideologies, and the links between sexuality and the reproduction of cultural norms. Topics include cross-cultural variation in sexual expression, sex and reproduction as commodities, sexuality and violence, sexually transmitted diseases and social policy. Compares sexuality issues in the United States to those of other cultures.

SOA 1310 Global Markets and Local Cultures 4 QH

Discusses selected topics in the socioeconomic transformation of other cultures, including urbanization, industrialization, commodity production, and international labor migration. Focuses on the impact of capitalist development on contemporary third world and postcolonial societies; examines local responses to those changes.

SOA 1320 Anthropology Methods 4 QH

Examines theory and practice of methods of field research and data analysis. Gives students the opportunity to take part in a field project.

SOA 1335 Language and Culture 4 QH

Focuses on the anthropological study of linguistics. Presents basic theories of sociolinguistics and explores language in its social context. Includes animal communication; language learning; language and mind; cognitive and symbolic anthropology; the ethnography of speaking, speech, and boundaries; multilingualism; language and gender; language and ethnicity; language and social class; and pidgins and Creoles. Includes several field assignments.

SOA 1345 People in Cities 4 QH

Studies urban life and urban problems, using international case studies. Addresses rural/urban and international migration, the relationship of urban settlement to employment patterns, the creation of inner-city or suburban ghettos or squatter settlements, and movements for city services in areas of spontaneous growth. Gives students the chance to design and implement a field project.

SOA 1425 Cultural Survival 4 QH

Examines the problems faced by today's tribal peoples and national minorities. Using cross-cultural case studies, analyzes the relationship of governmental policies and economic development priorities to the survival of self-identified tribal cultures and minority populations throughout the world. Examines human rights, nationalism, and cultural autonomy, resistance, and self-determination.

SOA 1430 Latin American Society and Development 4 QH

Explores the processes of social, economic, and cultural change in Latin America. While concentrating on the present, traces class formation, agrarian structures, ethnic identity, ceremonial organization, gender roles, and political conflict since the colonial era in a range of countries. Emphasizes the relationship of communities and national political and economic systems. May emphasize Central America and Mexico or countries in South America through case studies. (IV)

SOA 1431 Native North Americans 4 QH

Explores North American Indian tribes including the Dakota (Sioux), Navajo, Pueblo, Mohawk, and Penobscot, and examines the historical changes that led to their contemporary situation. Focuses on the reservation and its many problems from various viewpoints.

SOA 1470 Religion and Myth 4 QH

Focuses on nature and institutionalization of primitive, ancient, and contemporary religions. Explores religious concepts and movements in relation to social, religious, and political organization.

SOA 1704 Cultures of the World (Honors) 4 QH

Honors equivalent of SOA 1104.

SOA 1800, SOA 1801 Directed Study 4 QH each

Offers independent work on a chosen topic under the direction of members of the department. *Prereq.* Senior standing and department approval.

SOA 1820, SOA 1821, SOA 1822, SOA 1823 4 QH each

Junior/Senior Honors Project

For details contact the honors office.

SOA 3100 Theory 4 QH

Graduate school course open to qualified undergraduates with permission of instructor.

Art and Architecture

ART 1100 History of Art to 1400 4 QH

Provides a survey of Western art from prehistoric times to the Renaissance.

ART 1101 History of Art Since 1400 4 QH

Surveys Western art from the Renaissance to the twentieth century.

ART 1106 Introduction to Art 4 QH

Offers an introduction to the characteristics of the visual arts, including painting, sculpture, graphic arts, and architecture. Studies various examples of works of art as an introduction to style and technique. Includes visits to museum collections and contemporary art galleries. (II)

ART 1111 Introduction to Architecture 4 QH

Introduces the history, theory, and practice of architecture. Shows how architects in different historical periods have balanced the demands of function, construction and aesthetics. Concentrates on specific design problems found in churches, houses, skyscrapers, and cities.

ART 1124 Basic Drawing 4 QH

Offers intensive drawing instruction. Focuses on developing a formal understanding of the structure of objects and figures as well as increased dexterity with a variety of drawing tools. Includes experiments with materials such as wash, charcoal, and pencil.

ART 1127 Basic Painting 4 QH

Presents an introductory studio course in the fundamental techniques of painting. Formal problems in the study of color, light, space systems, form, and composition establish the foundation for more individual creative expression. Uses critiques and slide lectures as needed.

ART 1130 Visual Studies Foundation 1**4 QH**

Offers an introductory lecture/studio course clarifying basic principles, language, and concepts inherent in visual language systems. Concentrates on two-dimensional media including photography, painting, video, and film as related to the fundamentals of composition, space relationships, effects of color, form, pattern repetition, structure, figure-ground relationships, balance, and unity.

ART 1131 Visual Studies Foundation 2**4 QH**

Explores three-dimensional form. Examines principles including mass, volume, line, plane, and texture. Introduces basic materials and structure through constructing models and prototypes. Presents sequential exercises with simple eye/hand skills and form recognition. Explores complex projects that require an understanding of context, content, and developing original forms. *Prereq.* ART 1124 and ART 1130.

ART 1132 Principles of Graphics**4 QH**

Offers intensive study in graphic form principles through assigned problems, critiques, and lectures that emphasize formal and conceptual understanding. Develops the visual problem-solving process including comprehending problem objectives, working to specifications, investigating alternatives, and presenting professionally crafted solutions. *Prereq.* ART 1130 or permission of instructor.

ART 1133 Graphic Design 1**4 QH**

Introduces applied graphic design. Explores photographic image making and manipulation, as well as letterform and type, as approaches to visual problem-solving. Emphasizes formal relationships and investigates concept development through sequence and series. Refers to visual books, graphic system, and moving images. *Prereq.* ART 1132, ART 1134, and ART 1160.

ART 1134 Typography 1**4 QH**

Introduces letterforms in visual communication. Studies typography as form, typographic contrast principles, text organization and hierarchy, the typographic grid, legibility, and letterspacing. Explores the history and variety of typefaces. Includes assigned projects, readings, and lectures. *Prereq.* ART 1130 or permission of instructor.

ART 1144 Typography 2**4 QH**

Builds on the letterform, typography, and grid studies begun in ART 1134 and applies them in a series of projects that focus on text type, legibility, readability, structure, and contrast in publication design and in typographic approaches to information design. *Prereq.* ART 1134.

ART 1150 Architectural Design 1**4 QH**

Introduces conceptual thinking about the design of the built environment. Recent studio work has included analyses of seminal modern houses, design projects for memorials, idea-based houses, and the urban landscape. Focuses on integrating imagination into solving these design problems. *Prereq.* ART 1156.

ART 1151 Architectural Design 2**4 QH**

Introduces the structure and order of architectural thinking. Includes projects such as compositional exercises, formal analysis, and additions to important modern buildings. Studies the analytical tools for understanding the relationship of building elements to the ideas that inform them. *Prereq.* ART 1150.

ART 1156 Architectural Drafting**4 QH**

Introduces architectural drafting techniques, tools, materials, lettering, and dimensioning. Students will be expected to make orthographic, axiometric, one- and two-point perspective drawings.

ART 1160 Introduction to Photography**4 QH**

Explores the basics of black and white photography. Introduces the 35mm camera, negative processing, and black and white printing in the department's state-of-the-art lab. No camera nor previous photography experience required.

ART 1170 Filmmaking Workshop**4 QH**

Introduces students to the nature and creative uses of video. Examines video's technological foundation, conventions, and aesthetic potential. Emphasizes weekly hands-on lab assignments and substantive final project. Includes lectures, screenings, and critiques. Facilities and equipment are provided by the department.

ART 1180 Video Basics**4 QH**

Introduces the fundamental nature of the video medium and its creative use. Examines the technological foundation of video, the established conventions of effective field and studio production techniques and postproduction techniques (electronic editing), and explores the aesthetic potential of both the visual and auditory aspects of video. Emphasizes weekly hands-on lab assignments with a final substantive video project required of each student. Facilities and equipment are provided.

ART 1190 Introduction to Computer Graphics**4 QH**

Introduces visual problemsolving with computers. Emphasizes the medium's special properties and its potential. *Prereq.* ART 1130 and ART 1131 or permission of instructor.

ART 1203 Medieval Architecture**4 QH**

Studies the major religious and secular buildings of the Early Christian, Byzantine, and Gothic periods, emphasizing Gothic architecture of France and England.

ART 1204 Renaissance Architecture**4 QH**

Focuses on architecture and urban form in Italy between 1400 and 1600, with some emphasis on Renaissance architecture in France and England.

ART 1205 Renaissance Art**4 QH**

Examines Italian painting and sculpture from the early fourteenth century to the end of the sixteenth century, with emphasis on the art of the great painters and sculptors of the period such as Botticelli, Donatello, Leonardo, Michelangelo, and Titian. The art will be considered in the context of the social, political, philosophical, and religious issues of the time.

ART 1210 Nineteenth Century Painting**4 QH**

Examines European painting and related arts including the neo-classical, romantic, realist, and impressionist movements. Emphasizes French painting, but also considers important developments in England and other western European countries.

ART 1213 Modern Art**4 QH**

Traces the development of painting, sculpture, and related arts from European avant-garde in the late nineteenth century to the international market of the late twentieth century. Topics

include challenges to traditional boundaries between media, the development of abstraction and the idea of pure form, and the recent emergence of a post-modern aesthetic.

ART 1218 African American Art History 4 QH

Black art, like black literature, has always been an important aesthetic social statement by the African-American artist. This course offers a historical and critical examination of African-American art from the nineteenth century to the present, with special emphasis on the effects of European and African art styles on the black artist in America.

ART 1220 American Art 4 QH

Surveys the history of American painting and sculpture from the seventeenth century to the present. Focuses on the cultural forces that shape the evolution of art in America. Includes frequent museum visits.

ART 1223 American Architecture 4 QH

Introduces American architecture, town planning, and urban design from the 1700s to the 1930s. Considers European influences and uniquely American contributions.

ART 1225 Modern Architecture 1 4 QH

Surveys the development of modern architecture in England, France, Germany, and the United States from the mid-eighteenth to the late nineteenth century. Discusses architecture and urban design as a cultural response to society's changing conditions. Considers such themes as symbolism, morality, rationalism, and functionalism. *Prereq.* ART 1111 or permission of instructor.

ART 1226 Modern Architecture 2 4 QH

Examines the forms and principles of European and American architecture of the twentieth century, emphasizing the work of such key figures as Frank Lloyd Wright, Mies van der Rohe, Le Corbusier, and Louis Kahn; and such influential movements as the Dutch de Stijl, Russian constructivism, and American post-modernism.

ART 1230 History of Photography 4 QH

Explores photography from its origins in the early nineteenth century to its maturity in the mid-twentieth century. Surveys technological developments but emphasizes the emergence of photography as an expressive medium and its relation to other modern art forms.

ART 1233 Contemporary Directions in Photography 4 QH

Studies prevailing trends in photographic artistic expression from the beginning of the twentieth century to the present. Examines the importance of photographic imagery in relation to our surroundings through lecture and slide presentations.

ART 1235 History of Film 4 QH

Surveys major international developments in film from the late nineteenth century to the present. Examines national movements, technological and aesthetic innovations, important figures, and significant films. Includes films, lectures, and discussions.

ART 1236 American Film 4 QH

Surveys the rise of the American film from the late nineteenth century to the present. Examines key films, directors, major themes, and film forms and techniques. Includes lectures, screenings, and discussions.

ART 1240 History of Graphic Design 4 QH

Considers the history, context, and issues of graphic design through lectures, readings, discussions, and projects. *Prereq.* ART 1101.

ART 1241 Advertising Design 4 QH

Explores the principles and practices of advertising through projects, lectures, readings, discussions, and in-class presentations and workshops. *Prereq.* ART 1132 and ART 1134.

ART 1243 Graphic Design 2 4 QH

Investigates the expressive visual potential of words and images. Explores visual poetry, the connotations of mark and form choice, and applied semiotics. Includes assigned projects, readings, discussions, and lectures. *Prereq.* ART 1133 and ART 1250.

ART 1244 Graphic Design 3 4 QH

Introduces problem-solving methodologies and applies them to complex communications problems. Uses research, teamwork, and brainstorming to define the problems, and develops and formally refines the solutions. *Prereq.* ART 1243.

ART 1250 Color Theory and Practice 4 QH

Focuses on the optical phenomena of color and their application in visual communication. Studies hue, value, and saturation, and their implications for color activity, legibility, and spatial illusion in traditional and electronic media.

ART 1252 Architectural Design 3 4 QH

Addresses the issue of building typology. Offers students the opportunity to learn to use, as models in their own work, the formal, organizational, and cultural similarities of buildings from throughout history with similar uses. Gives meaning to the study of architectural history and allows history to inform the current design process. *Prereq.* ART 1151.

ART 1253 Architectural Design 4 4 QH

Studies the effect of external circumstance on the architectural process. In addition to studying historical urbanism, students will work with ideas about landscape and aesthetic frameworks that can govern projects from without. Projects are studied at several scales, from the aerial map to the building detail. *Prereq.* ART 1252.

ART 1254 Intermediate Drawing 4 QH

Focuses on heightening the student's understanding of spatial awareness, scale movement, and expression. Students will be asked to create unusual environmental situations for their figurative compositions. A variety of media will be used, including wash, pen and ink, watercolor, chalk, charcoal, and pencil. *Prereq.* ART 1124 or equiv.

ART 1256 Theory of Structures 1 4 QH

Introduces the theory of materials and structures. Examines basic structural elements in masonry and wood construction. Uses historic and current building types to explore the relationship between structure, materials, construction process, and architectural space. Includes lectures, discussions, field trips, and student presentation of structural models and diagrams. *Prereq.* PHY 1222.

ART 1257 Theory of Structures 2 4 QH

Continues ART 1256, combining the basic structural elements to develop structural systems. Explores form, stability loading,

and materials in relation to the design of foundation, structural steel, reinforced concrete, timber, frame, space frame, and shell systems. *Prereq.* ART 1256 and PHY 1222.

ART 1258 Architectural Design 5 4 QH
Studies the construction and fabrication processes and the impact of these processes on the thinking of designers. Examines the relationship between schematic ideas and materials. *Prereq.* ART 1226 and ART 1253.

ART 1259 Architectural Design 6 4 QH
Studies the work of a particular architect or architectural movement. Students are expected to relate their design solutions to the buildings and design principles created by the architect or architectural movement chosen for the course. *Prereq.* ART 1226 and ART 1258.

ART 1261 Intermediate Black and White Photography 4 QH
The second-level black and white photography studio/lab course with emphasis on combining personal aesthetic choices with refined darkroom skills. The zone system for roll film cameras, toners, fiber based papers and alternative film choices will be demonstrated and assigned. A final portfolio is required for successful completion of the course. Lab fee. *Prereq.* ART 1160 or *equiv.*

ART 1263 Introduction to Color Photography 4 QH
Introduces shooting, processing, and printing color negative films. Lectures cover basic color theory in relationship to photography as well as contemporary color photographic processes. Working with color negative films, students get hands-on experience in the C-41 process for developing film and the EP-2 process for printing color negatives. Weekly assignments emphasize solving technical and aesthetic problems inherent in dealing with color negative materials. Hands-on labs allow students to produce final projects. Color chemistry and facilities are provided. *Prereq.* ART 1160 or *equiv.*

ART 1265 Color Transparency Production and Printing 4 QH
Covers shooting, processing, and printing of color transparency materials. Discusses and demonstrates E-6 and Cibachrome processes. Encourages experimental processes such as transparency film cross-processed, negative films cross-processed, and transparency film pushed and cross-processed. Lectures are supported by weekly critiques of student work; assignments stress the solving of technical and aesthetic problems. Lab time allows the student to produce the required final project and offers one-to-one interaction with the instructor. Chemistry and lab facilities are provided. *Prereq.* ART 1160 or *equiv.*

ART 1280 Media Graphics 4 QH
Offers applied video design projects. Develops visual logic, sequence, motion, and legibility. Includes assignments, demonstrations, and lectures. *Prereq.* ART 1180 and ART 1243.

ART 1281 Video Project 4 QH
Offers in-depth exploration of the video medium. Students research, write, and produce a documentary, fictional narrative, or experimental video project. Emphasizes innovation, personal authorship, effective research, sound conceptual development, formal and technical skills, and imaginative and creative soundtracks and visuals in video. *Prereq.* ART 1180 or *equiv.*

ART 1290 Electronic Publishing Design 4 QH
Investigates publication and periodical design issues including concept development, sequence, organization, page design, typography, and the typographic grid. Includes assignments using page layout software in the computer labs. *Prereq.* ART 1132, ART 1134, and ART 1190 or *equiv.*

ART 1291 Intermediate Computer Graphics Workshop 4 QH
Offers the opportunity to pursue individual projects and assigned studies in the computer environment. *Prereq.* ART 1190 or *equiv.*

ART 1295 Computer-Aided Design 4 QH
Introduces CAD processes for two- and three-dimensional modeling for architectural design. Studies computer-aided design techniques that support site and program analysis concept and schematic design, and design development and construction drawing applications.

ART 1296 Advanced Studio in Computer Visualization 4 QH
Continues ART 1295. Offers detailed, hands-on instruction in computer modeling and rendering. Offers students the opportunity to learn to manipulate two-dimensional, three-dimensional, and video images using IBM computers and AutoCAD. Includes topics such as ray tracing, solid modeling, and image synthesis. *Prereq.* ART 1295.

ART 1310 Seminar in Modern Architecture 4 QH
Explores contemporary issues in architectural theory, design, and practice. Examines historical forces and contemporary criticism to define the nature of modernism and post-modernism. Focuses on such architects as Louis Kahn, IM Pei, Philip Johnson, Robert Venturi and Denise Scott-Brown, Michael Graves, and Frank Gehry. *Prereq.* ART 1228 or *permission of instructor.*

ART 1330 Advanced Visual Communication 4 QH
Presents an advanced interdisciplinary studio seminar in visual and media design. In a chosen area of specialization, students explore their capabilities through the practical application of conceptual and technical skills. Lab fee. *Prereq.* *Permission of instructor.*

ART 1350 Architectural Thesis 4 QH
Offers an opportunity for each student to frame his or her own architectural problem and to formulate a response. Expects students to arrive with a project proposal and to review that proposal with the instructor over the first two weeks, spending the remainder of the quarter developing the project.

ART 1355 Environmental Systems 4 QH
Surveys the environmental systems of power, air, water, waste, and light as integral elements of architecture. Discusses the theory and practice of these systems in architectural design. Considers historical and contemporary examples of building systems that illustrate the function, technology, and aesthetics of environmental systems. Includes field trips, lectures, and individual student research projects. *Prereq.* ART 1252.

ART 1363 Advanced Photography Seminar 4 QH
Through close interaction with the teacher, students are asked to refine their technical skills and to make meaningful decisions about their relationship to the world around them through the use of black and white and/or color photography. Portfolio preparation, alternative processes, and large format will be combined to

form a base of skills with which to present the student's work to a larger photographic community. Stresses individual direction and a qualitative approach to substantive photography. *Prereq.* *Permission of instructor.*

ART 1713 Modern Art (Honors) 4 QH
Combines in-depth investigation of selected modern artists and movements with an overview of the diverse meanings and functions of modern art. Involves developing and presenting individual research projects. *Prereq.* *Honors status or permission of instructor.*

ART 1800, ART 1801, ART 1802 Directed Study 4 QH each
Offers independent work under the direction of members of the department on a chosen topic. *Prereq.* *Junior or senior art major and department approval.*

ART 1810, ART 1811, ART 1812, ART 1813 4 QH each
Junior/Senior Honors Program
For details contact the honors office.

Biology

Students should note that courses are presented by category and are not listed in a single numerical sequence.

Students should be aware that two (or more) courses with substantially the same content may not be counted toward quantitative graduation requirements. Some instances of overlap between biology courses are noted in the individual course descriptions below. However, in addition, certain combinations of courses (for example, BIO 1150 and BIO 1152) may cover essentially the same material, and certain courses in other departments of the University may duplicate certain biology courses. If a student is not sure whether particular courses overlap, the student should seek advice from departmental advisers or the Office of the Dean.

The following courses are primarily for students with little or no background in college science and mathematics. These courses are not open to biology majors.

BIO 1111 Environment and Man 4 QH
Offers an ecological analysis of man's interaction with other organisms. Presents the necessary foundation of biological principles. *Not open to biology majors.*

BIO 1150 Human Anatomy and Physiology I 5 QH
Focuses on cellular and tissue structure and function, and anatomical terminology. Topics include histology, anatomy, and physiology of bones, muscles, blood, and nervous systems. Lab includes a study of human bones, cat dissection, and related histology. Lab fee. *Not open to biology majors.*

BIO 1151 Human Anatomy and Physiology 2 5 QH
Covers anatomy and physiology of the respiratory, digestive, urogenital, and circulatory systems; physiology of endocrine system; a brief exploration of the anatomy and physiology of eye and ear. Lab includes studies of muscle and nerve physiology, blood physiology and histology, and physiology of respiration. Lab fee. *Prereq.* *BIO 1150; not open to biology majors.*

BIO 1152 Integrated Human Anatomy and Physiology 1 4 QH
Introduces students to human anatomy and physiology. Focuses on cell and tissue structure and function; and anatomy and physi-

ology of the integument, nervous system, vision and hearing, and skeletal system. Lab fee includes pig dissection. *Not open to biology majors.*

BIO 1153 Integrated Human Anatomy and Physiology 2 4 QH
Presents the structure and function of the following systems: muscular, endocrine, reproductive, vascular, and immune. Lab fee includes pig dissection. *Prereq.* *BIO 1152; not open to biology majors.*

BIO 1154 Integrated Human Anatomy and Physiology 3 4 QH
Presents the structure and function of the cardiovascular, respiratory, urinary, and digestive systems and the regulation of metabolism and body temperature. Lab fee. Lab includes pig dissection. *Prereq.* *BIO 1153; not open to biology majors.*

BIO 1181 The Human Organism 4 QH
Designed for nonscience majors, introduces the structure and function of the human body. Emphasizes the principles of biological and physical science as they relate to life processes in health and disease. Lab experiments explore the workings of the students' own biological systems rather than those of other animals. Lab fee. (II) *Not open to biology majors.*

BIO 1187 Biology of Human Reproduction 4 QH
Covers structure and function of male and female reproductive systems; factors affecting sexual development, fertility, and reproductive behavior in the human species; physiology of coitus, fertilization, pregnancy, birth, and lactation; methods of controlling fertility; and sexually transmitted diseases. (II) *Not open to biology majors.*

The following courses are primarily for students majoring in science- or health-related professions or other majors (nonbiology) with equivalent background in college science and mathematics. These courses are not open to biology majors.

BIO 1115 Introduction to Human Biology 4 QH
Introduces students to cell biology, genetics, and animals, such as roundworms, that cause health problems. Lab fee. *Not open to biology majors.*

BIO 1120 Basic Microbiology 4 QH
Microbial life, emphasizing morphological characteristics, physiological activities, and disease production. Lab fee. (Overlaps BIO 1320, BIO 1121, and BIO 1221.) *Prereq.* *BIO 1140, or permission of instructor; not open to biology majors.*

BIO 1121 Introductory Microbiology 3 QH
Same as BIO 1120, but without lab. *Not open to biology majors.*

BIO 1140 Basic Animal Biology 1 4 QH
Covers principles of biology; universal properties and processes of living organisms as exemplified by the cell and its activities, inheritance, evolution, and environmental relationships. Lab fee. (Overlaps BIO 1106.) *Not open to biology majors.*

BIO 1141 Basic Animal Biology 2 4 QH
Offers systematic, comparative study of the structure and functions of animals. Considers the diversity of animals from the standpoint of evolutionary adaptation. Lab fee. (Overlaps BIO 1107.) *Prereq.* *BIO 1140; not open to biology majors.*

BIO 1171 Focus on the Sea: Issues and Nature**2 QH**

Explores marine conservation issues through lectures, discussion, and field trips to coastal habitats and islands. Studies the sea from ecological, economic, and literary perspectives.

BIO 1175 Introduction to Marine Biology**4 QH**

Offers a broad introduction to the field emphasizing principles of oceanography and marine biology. Presents the physical, geological, and biological aspects of the ocean. Discusses the diversity of marine life and how organisms interact within different marine communities. (II) *Not open to biology majors.*

BIO 1221 General Microbiology**3 QH**

Same as BIO 1320, but without lab. Not applicable for the biology major or graduate credit. *Prereq.* *Permission of instructor; or CHM 1265, BIO 1260, and BIO 1261; required courses may be taken concurrently.*

The following three courses are primarily for biology majors but are open to other students with the permission of the instructor.

BIO 1103 Principles of Biology I**5 QH**

Introduces the basic principles of biology, offering an information base for the remainder of the biology core. Topics include scientific method, cell metabolism, growth, development, elementary genetics, nutrition, photosynthesis, and respiration. Lab fee.

BIO 1104 Principles of Biology 2**5 QH**

Covers structure and function of animals, structure and general physiology of animal cells, and evolution of adaptive diversity of animals. Lab fee. *Prereq.* *BIO 1103.*

BIO 1105 Principles of Biology 3**5 QH**

Discusses the molecular mechanisms of microbial and plant life. Introduces the various systems of plants and their role in the biological world, illustrated with lab experiments and dissection. Lab fee. *Prereq.* *BIO 1103 and BIO 1104.*

BIO 1106 General Biology**4 QH**

Focuses on universal properties and processes of living organisms. Topics include cellular composition and cellular control, heredity, the evolutionary process, and environmental relationships. Lab fee. (Normally not for freshman biology majors. Overlaps BIO 1140.)

BIO 1107 Animal Biology**4 QH**

Offers a systematic comparative study of the structure and functions of animals. Considers the diversity of animals from the standpoint of evolutionary adaptation. Lab fee. (Normally not for freshman biology majors. Overlaps BIO 1141.) *Prereq.* *BIO 1106.*

BIO 1133 Plant Biology**4 QH**

Introduces the structure of plant cells, structure and function of roots, stems, and leaves of flowering plants. Survey of the major groups in the plant kingdom, including their morphology, reproductive biology, and economic importance. Lab fee. *Prereq.* *BIO 1106 and BIO 1107, or BIO 1103 through BIO 1105.*

BIO 1211 Environmental and Population Biology**4 QH**

Considers the physicochemical factors influencing and influenced by organisms. Covers interactions among individual organisms and among species; change of species by genetic natural selection; development of communities and function of ecosystems.

Lab fee. (II) *Prereq.* *BIO 1107 and BIO 1133 or BIO 1103 through BIO 1105, CHM 1111.*

BIO 1260 Genetics and Developmental Biology**4 QH**

Focuses on elaboration of the classic laws of heredity, cytogenetics, molecular basis of heredity, and selected examples of the development of form and function. Lab. Lab fee. *Prereq.* *BIO 1107-BIO 1133 or BIO 1103-BIO 1105 and CHM 1264.*

BIO 1261 Cell Physiology and Biochemistry**4 QH**

Covers basic chemical and physical enzyme kinetics; processes of cells related to their fine structure; oxidative and intermediary metabolism; photosynthesis, membrane phenomena; chemical and physical processes of prokaryotic and eukaryotic cells. Lab fee. *Prereq.* *BIO 1107 or BIO 1103-BIO 1105 and BIO 1260, CHM 1265, and CHM 1221.*

BIO 1270 Diving Research Methods**4 QH**

Introduces students to techniques in the study, ecology, and physiology of subtidal marine organisms. Focuses on underwater research methods, their appropriate applications, and their implementation during field exercises under water. Topics to be covered include diving physiology, sampling design, experimental design, statistical analysis of data, population censusing methods, under water measurements of hydrodynamics, in situ respirometry, underwater telemetry, underwater photography, and the use of underwater habitats and submersibles in research. Lab fee. *Prereq.* *Scuba certification.*

BIO 1311 Evolution**4 QH**

Focuses on evolutionary history, evidence, mechanisms, and theories. Emphasizes topics of current interest in evolution. Lab fee. *Prereq.* *BIO 1107 or BIO 1103 and BIO 1260.*

BIO 1312 Marine Ecology**4 QH**

Studies marine habitats and organisms. Focuses on primary and secondary productivity, and community structure and dynamics. Emphasizes through field work the Pacific Northwest intertidal and shallow subtidal communities. East/West program. *Prereq.* *Two years of college biology.*

BIO 1320 General Microbiology**5 QH**

Provides morphological, ecological, and biochemical consideration of representative groups of bacteria. Introduces virology and microbial genetics; host-parasite relationships, including basic immunological considerations; prokaryotes of medical significance; and physical and chemical controls of microbial growth. (Overlaps BIO 1120 and BIO 1221.) Lab fee. *Prereq.* *Permission of instructor.*

BIO 1330 Marine Botany**4 QH**

Explores taxonomy of the major groups of marine plants, primarily algae. Investigates ecological and reproductive strategies, economic importance, and roles in diverse marine communities. Mandatory field trips in addition to lab. Lab fee.

BIO 1332 Molecular Marine Botany**4 QH**

Introduces modern biochemical and molecular approaches used to examine systematic and evolutionary problems at the species level and above. Offers extensive hands-on laboratory experience in isozyme electrophoresis, DNA isolation, and restriction fragment analysis. Expects students to conduct individual projects, applying techniques they have learned to topics dealing with the local seaweed and seagrass flora. Lab fee. *Prereq.* *BIO 1330.*

- BIO 1341 Vertebrate Zoology** 4 QH
Emphasizes the systematics, natural history, zoogeography, and behavior of all classes of vertebrates. Labs consist of study of specimens and field and museum trips. Lab fee. *Prereq.* BIO 1107 or BIO 1104, and BIO 1211.
- BIO 1342 Biology of Crustacea** 4 QH
Studies systematics, morphology, and biology of the smaller Crustacea. Focuses on non-malacostracan orders, but includes those malacostracan taxa dominated by small forms. *Prereq.* BIO 1370 or GEO 1428.
- BIO 1347 Embryology** 5 QH
Topics include gametogenesis, fertilization, cleavage, gastrulation, induction, organogenesis, and metamorphosis in vertebrates. Emphasis is on frog, chick, and pig in the lab. Lab fee. *Prereq.* BIO 1107 or BIO 1105, and BIO 1260.
- BIO 1348 Animal Histology** 4 QH
Offers microscopic study of fundamental types of animal tissues. Lab fee. *Prereq.* BIO 1105 or BIO 1107.
- BIO 1350 Regulatory Physiology** 5 QH
Introduces physiological control systems including transport processes, cellular basis of nerve function, action of chemical messengers and regulators, and principles of cellular contraction and motility. *Prereq.* BIO 1103 and BIO 1104, or BIO 1106 and BIO 1107.
- BIO 1351 Comparative Vertebrate Anatomy** 5 QH
Focuses on morphology and phylogeny of the vertebrates. Lab studies taxonomy of the group and specific morphology of the dogfish shark, the mud puppy, the alligator, and the cat. Lab fee. *Prereq.* BIO 1105 or BIO 1107.
- BIO 1370 Marine Invertebrate Zoology** 5 QH
Topics include functional morphology, systematics, ecology, and phylogenetic relationships of the major invertebrate phyla. Lab emphasizes utilization of living marine forms, with dissection of representative organisms. Lab fee. *Prereq.* BIO 1105 or BIO 1107.
- BIO 1371 Biological Oceanography** 4 QH
Offers labs and lectures encompassing the principles of biological oceanography. Topics include physical and chemical aspects of the ocean environment, the distribution, production, and interactions of marine planktonic organisms, and ecosystem characteristics of specific oceanographic environments. Emphasizes participation in sampling and analysis using current instrumentation and methods. Lab fee. *Prereq.* BIO 1104, BIO 1107, BIO 1141, or *equiv.*
- BIO 1411 Tropical Terrestrial Ecosystems** 3 QH
Introduces students to the plants, animals, and ecosystems of terrestrial Jamaica. East/West Program. *Prereq.* Two years of college biology.
- BIO 1412 Benthic Marine Ecology** 4 QH
Examines the interactions among bottom-dwelling invertebrates, fish, and plants and their environment. Quantitative field methods and new developments in ecological theory will be applied to examinations of the rocky intertidal zone, soft sediment areas, salt marshes, and the rocky subtidal zone. Lab fee. *Prereq.* BIO 1211; BIO 1341 recommended.
- BIO 1420 Microbial Physiology** 4 QH
Focuses on structure and function of the bacterial cell, emphasizing its general properties as well as on the physical and chemical factors that influence it. Lab fee. *Prereq.* BIO 1320 or *equiv.*
- BIO 1427 Medical Microbiology** 4 QH
Topics include host parasite interactions: virulence, toxins, natural flora, immunological responses; characteristics of the common bacterial, rickettsial, and protozoal infections in humans; epidemiology, pathology, vaccines, and chemotherapy. Lab fee. *Prereq.* BIO 1320 or *equiv.*
- BIO 1430 Plant Physiology** 4 QH
Focuses on the physiology and biochemistry of plants as a whole and at the cellular and organ levels. Considerations of mineral and nutrition, photosynthesis, hormones, growth, and development are included. Attendance at a weekly four-hour lab, as well as preparation of a paper based on the research literature, is required. Lab fee. *Prereq.* BIO 1105 or BIO 1133, and CHM 1265.
- BIO 1432 Higher Plants** 4 QH
Offers study of vascular plants (club mosses, ferns, gymnosperms, and angiosperms). Origin, ecology, development, structure, paleobotanical evidence, reproductive strategies, and economic uses. Field trips included. Lab fee. *Prereq.* BIO 1105 or BIO 1133.
- BIO 1437 Structural Botany** 4 QH
Focuses on comparative developmental anatomy of seed plants. Lab fee. *Prereq.* BIO 1105 or BIO 1133.
- BIO 1440 Advanced Invertebrate Zoology** 4 QH
A lecture, field, and lab course that concentrates on one or two phyla. Subject varies from year to year, depending upon expertise of available faculty. An individual research project is required. Lab fee. *Prereq.* Two years of college biology.
- BIO 1441 Parasitology** 4 QH
Focuses on symbiotic relationships of protozoans, mesozoans, flatworms, nematodes, acanthocephalans, and arthropods. Lab. Lab fee. *Prereq.* BIO 1107 or BIO 1105, and BIO 1260.
- BIO 1442 Vertebrate Paleontology** 4 QH
Examines evolution of the vertebrates, including humans, as revealed through the fossil record. Lab, museum, and field studies. Lab fee. *Prereq.* BIO 1107 or BIO 1105, BIO 1211, BIO 1260; or permission of instructor.
- BIO 1446 Ornithology** 4 QH
Studies the phylogeny, anatomy, physiology, behavior, and ecology of birds. Includes field observation, lab preparation, and study of specimens. Lab fee. *Prereq.* BIO 1104 or BIO 1107, and BIO 1211.
- BIO 1447 Herpetology** 4 QH
Lectures emphasize the natural history, behavior, systematics, and zoogeography of recent amphibians and reptiles. Lab consists of identification and preparation of specimens, particularly local species. Mandatory field trips. Lab fee. *Prereq.* BIO 1105 or BIO 1107, and BIO 1260.

BIO 1448 Mammalogy**5 QH**

Offers study of phylogeny, anatomy, physiology, and natural history of mammals. Field collection, lab preparation, and study of specimens are included. Lab fee. *Prereq.* BIO 1104 or BIO 1107, and BIO 1211.

BIO 1449 Marine Birds and Mammals**4 QH**

Focuses on the phylogeny, systematics, zoogeography, morphology, physiology, reproduction, behavior, and ecology of birds and mammals associated with the marine environment, with lab emphasis on species that occur along the New England coast. Labs include identifying, dissecting, and preparing specimens. Lab fee. *Prereq.* BIO 1211 and BIO 1104 or BIO 1107, and BIO 1141.

BIO 1450 Immunology**4 QH**

Provides an overview of the structure and function of genes, proteins, and cells involved in the generation of the immune response. Emphasizes molecular immunology and immunogenetics. *Prereq.* BIO 1261. *Take concurrently with BIO 1467.*

BIO 1453 General Physiology of Invertebrates**4 QH**

Surveys basic animal functions as manifested among the major groups of invertebrates, with comparisons to the vertebrates, especially aquatic vertebrates. Considers the cellular and biochemical bases for the functions, their control, their adaptiveness to diverse environments, and their evolutionary implications. Topics usually include respiration, circulation, nutrition, metabolism, excretion, salt and water balance, temperature responses, biological clocks, sensory organs, and various effector organs. Lab fee. *Prereq.* BIO 1261.

BIO 1454 Comparative Vertebrate Physiology**4 QH**

Considers physiological principles in the context of the phylogenetic diversity of the vertebrates, with emphasis on adaptations of animals to aspects of their life histories and environments. Comparisons with invertebrate systems will be made when appropriate. Major themes to be considered include: energetics, temperature, circulation, respiration, skeletal muscle, and salt and water balance. Lab fee. *Prereq.* BIO 1261.

BIO 1457 Neuroethology**4 QH**

A lecture, field, and lab course concentrating on the mechanisms underlying behavior of model invertebrates and lower invertebrates. Aims to develop a framework to explain behavior in terms of properties and connectivity of neuronal circuits. Topics to be covered include: the cellular biology of neurons and neuronal circuits, the organization of sensory and motor systems, and field and lab analysis of simple behaviors. Lab fee. *Prereq.* BIO 1105.

BIO 1460 Current Concepts in Cell Biology**4 QH**

Examines selected topics in cellular structure and function of eukaryotes, for example, their electrical and mechanical characteristics and the underlying physical and biochemical processes. Topics will vary depending upon the instructor. Lab fee. *Prereq.* BIO 1261 and *physics*.

BIO 1461 General Biochemistry 1**4 QH**

Surveys biochemistry, emphasizing protein structure, the nature of enzymic catalysis, bioenergetics, and the metabolism of carbohydrates, lipids, and amino acids. *Prereq.* BIO 1260 and *organic chemistry*.

BIO 1462 General Biochemistry Laboratory**4 QH**

Introduces modern research techniques used in biochemistry and molecular biology. Topics include purification and characterization of proteins, kinetic properties of enzymes, isolation of high molecular weight DNA, recombination of DNA molecules in vitro, isolation of bacterial clones containing recombinant molecules, and in vitro mutagenesis. Covers safety and moral concerns raised by genetic engineering. Includes two hours of lecture and seven hours of lab. Lab fee. *Prereq.* BIO 1461.

BIO 1463 General Biochemistry 3**4 QH**

Emphasizes the structure and function of organelles, mechanisms of hormonal control of metabolism, and gene regulation. *Prereq.* BIO 1461, BIO 1467.

BIO 1467 Molecular Biology**4 QH**

Emphasizes experimental design and proof in macro-molecular chemistry and genetics. Studies current theories of the detailed molecular mechanisms for the preservation, expression, and evolutionary development of biological information. Applies theories to general biological and health problems and devotes a two-hour period each week to problem solving, research "game playing," and model building. *Prereq.* BIO 1261.

BIO 1470 Coastal Biology (Washington Coast)**4 QH**

The first of a series of three courses intended to introduce the student to a wide range of coastal environments. Includes studies of the open ocean, rocky intertidal areas, sandy beaches, and estuarine environments of the Washington coast. Demonstrates basic biological principles through comparative studies. East/West Program.

BIO 1471 Coastal Biology (Caribbean Coast)**4 QH**

The second of a series of three courses intended to introduce the student to a wide range of coastal environments. Includes studies of the open ocean, rocky intertidal areas, sandy beaches, and estuarine environments of the Caribbean. Demonstrates basic biological principles through comparative studies. East/West Program.

BIO 1472 Coastal Biology (New England Coast)**4 QH**

The third of a series of three courses intended to introduce the student to a wide range of coastal environments. Includes studies of the open ocean, rocky intertidal areas, sandy beaches, and estuarine environments of the New England coast. Demonstrates basic biological principles will be demonstrated through comparative studies. Offered at Marine Science Center in Nahant.

BIO 1475 Biology and Ecology of Fish**4 QH**

Examines the ecology, evolution, systematics, and behavior of fish. Uses field study, lectures, and labs. Studies specimens taken from New England waters. Lab fee. *Prereq.* Two years of college biology.

BIO 1477 The Biology of Corals**4 QH**

A field, lecture, and lab course which concentrates on tropical cnidaria. The course will study the systematics, anatomy, physiology and ecology of this group of animals which assume such an important role in tropical marine ecosystems. East/West Program. *Prereq.* Two years of college biology.

BIO 1478 The Biology of Fish**5 QH**

A field, lecture, and lab course that examines the systematics, anatomy, behavior and ecology of fish. Tropical forms are emphasized. *Prereq.* Two years of college biology.

BIO 1479 Adaptations of Aquatic Organisms**4 QH**

Explores aquatic organisms through a study of their evolutionary responses to the aquatic habitat. Considers the physical properties of water that have affected form, function, and behavior of all aquatic organisms. Uses density, viscosity, diffusion rates, pressure effects, and elementary fluid mechanics to explain such characteristics as the body shape of larvae, hearing and sound production, suspension feeding, and buoyancy. Course includes lectures, labs, demonstrations, and individual research projects. Offered at Marine Science Center in Nahant. *Prereq.* Two years of college biology.

BIO 1480 Senior Biochemistry Seminar**1 QH**

Examines recent developments in various topics of biochemistry. Emphasizes student presentation and analysis. *Prereq.* BIO 1103 through BIO 1261 or BIO 1463.

BIO 1490 Senior Seminar**1 QH**

Examines recent developments in various topics of zoology, microbiology, physiology, botany, ecology, genetics, and cell biology. Emphasizes student presentation and analysis. Limited to qualified juniors and seniors in the BA program and required of seniors in the BS program. *Prereq.* BIO 1103 through BIO 1261.

BIO 1491, BIO 1492 Directed Study 1, 2**2 QH each**

Offers independent work on a chosen topic under the direction of department faculty. Limited to qualified juniors and seniors with approval of the department and special arrangements with the supervising faculty member. The two quarters of this course together count as one biology department elective. *Prereq.* BIO 1103 through BIO 1261.

BIO 1495, BIO 1496, BIO 1497, BIO 1498**4 QH each****Junior/Senior Honors Project**

For details contact the honors office.

Chemistry

Introductory Chemistry Courses

CHM 1100 Special Topics in Chemistry**4 QH**

Examines fundamentals and applications of chemistry of particular interest to students in business. Discusses atomic theory, chemical bonding and reactions, states of matter and common chemicals, and foundations of organic chemistry. Makes applications to plastics and polymers, biochemistry, semiconductors, and nuclear power.

CHM 1110 General Chemistry Preliminaries**5 QH**

Introduces general chemistry by reviewing the required computational skills, basic nomenclature, and the mole concept. *Prereq.* Permission of the course coordinator for general chemistry for the life sciences.

CHM 1111 General Chemistry for the Life Sciences 1**5 QH**

Designed for nonchemistry majors. Focuses on basic concepts and definitions: the mole concept and chemical stoichiometry, states of matter, solutions, periodicity of elements, atomic structure, and chemical bonding and reactions. Lab fee. (II)

CHM 1112 General Chemistry for the Life Sciences 2A**5 QH**

For students who will not be taking further chemistry. Covers chemical equilibria; acids, bases, and buffers; introduction to the organic chemistry of compounds of biological relevance; introductory biochemistry of proteins, carbohydrates, lipids, and nucleic acids. Lab fee. *Prereq.* CHM 1111.

CHM 1122 General Chemistry for the Life Sciences 2B**5 QH**

For nonchemistry majors who will be taking CHM 1264. Subjects covered include chemical kinetics and equilibria, acids and bases, elementary thermodynamics and kinetics, and electrolysis and electrochemistry. Lab fee. *Prereq.* CHM 1111.

CHM 1130 Fundamentals of Chemistry**4 QH**

Focuses on applications and principles of chemistry. Examines elementary atomic theory, physical and chemical properties of matter, chemical reactions and stoichiometry, and chemical measurements with applications in engineering technology.

CHM 1131 General Chemistry for Engineering Students 1**4 QH**

Primarily for engineering students. Introduces the principles of chemistry, focusing upon the states and structure of matter and chemical stoichiometry.

CHM 1132 General Chemistry for Engineering Students 2**4 QH**

Primarily for engineering students. Introduces the principles of chemistry, focusing upon chemical equilibria, the nature of some common materials, and energy considerations in chemical and nuclear transformations. *Prereq.* CHM 1131.

CHM 1138 General Chemistry Laboratory**1 QH**

Required for students planning to major in chemical engineering. Optional for other students taking CHM 1132. Experiments pertaining to lecture material. Lab fee.

CHM 1151 General Chemistry for Science Majors 1**5 QH**

For chemistry majors and selected students in other majors, such as biology, physics, and so on. Focuses on basic concepts and definitions, moles, gas laws, stoichiometry, atomic structure, periodic properties, and chemical bonding. Lab fee.

CHM 1152 General Chemistry for Science Majors 2**5 QH**

Covers solutions, chemical kinetics, chemical equilibrium, chemical thermodynamics, electrochemistry, chemistry of the representative elements. Lab fee. *Prereq.* CHM 1111 or CHM 1151.

CHM 1153 The Chemical Elements**5 QH**

For chemistry majors and selected students in other majors. Applies the principal concepts of chemistry (thermodynamics, chemical bonding, kinetics) to a systematic survey of the characteristic behavior of the chemical elements and compounds. Lab fee. *Prereq.* CHM 1122, CHM 1132, CHM 1152, or equiv.

Advanced Chemistry Courses

CHM 1221 Analytical Chemistry**4 QH**

For nonchemistry majors. Covers the principles and practice of chemical methods of analysis with an introduction to spectrophotometry, ion selective electrodes, and gas chromatography. Discusses methods and applications for the fields of biology, clinical chemistry, toxicology, and environmental investigations. Lab fee. *Prereq.* CHM 1122 or equiv.

- CHM 1231 Analytical Chemistry for Majors** 5 QH
For chemistry majors. Covers the principles and practice of chemical methods of analysis with an introduction to spectrophotometry, ion selective electrodes, and gas chromatography. Examines method development, equilibrium limitations in analysis, and statistical evaluation of data as well as methods and applications for the fields of biochemistry, industrial chemistry, and chemical research. Lab fee. *Prereq.* CHM 1152 or equiv.
- CHM 1264 Organic Chemistry for Biology Science Majors 1** 5 QH
For nonchemistry majors. Covers nomenclature, preparation, properties, and reactions of common organic compounds. Lab fee. *Prereq.* CHM 1122, CHM 1152, or equiv.
- CHM 1265 Organic Chemistry for Biology Science Majors 2** 5 QH
Continues CHM 1264. Lab fee. *Prereq.* CHM 1264.
- CHM 1268 Organic Chemistry for Pharmacy Majors 1** 5 QH
For pharmacy majors. Covers nomenclature, preparation, properties, and reactions of common organic compounds. Lab fee. *Prereq.* CHM 1122, CHM 1152, or equiv.
- CHM 1269 Organic Chemistry for Pharmacy Majors 2** 5 QH
Continues CHM 1268. Lab fee. *Prereq.* CHM 1268.
- CHM 1271 Organic Chemistry for Chemistry Majors and Chemical Engineering Students 1** 3 QH
For chemistry majors, chemical engineering students, and selected students in other majors. Covers synthesis and properties of aliphatic and aromatic hydrocarbons and their functional derivatives, correlation between the structure of organic compounds and their physical and chemical properties, and electronic interpretation of organic reactions. *Prereq.* CHM 1153 or CHM 1132, and CHM 1138 or equiv.
- CHM 1272 Organic Chemistry for Chemistry Majors and Chemical Engineering Students 2** 5 QH
Continues CHM 1271. Lab fee. *Prereq.* CHM 1271.
- CHM 1273 Organic Chemistry for Chemistry Majors and Chemical Engineering Students 3** 5 QH
Continues CHM 1272. Lab fee. *Prereq.* CHM 1272.
- CHM 1280 Physical Chemistry for the Life Sciences 1** 4 QH
Examines physiochemical principles as they apply to biological processes. Covers thermodynamics, kinetics, equilibria, oxidation-reduction reactions, transport processes, quantum mechanics, and spectroscopy. *Prereq.* CHM 1122, CHM 1152, or equiv.
- CHM 1281 Physical Chemistry for the Life Sciences 2** 4 QH
Continues CHM 1280. *Prereq.* CHM 1280.
- CHM 1381 Physical Chemistry 1** 3 QH
Introduces chemical thermodynamics. Covers the three laws of thermodynamics and their applications to thermochemistry, material equilibrium, and reaction equilibrium. *Prereq.* CHM 1132, CHM 1152, or equiv.; MTH 1223, MTH 1243, or equiv.; PHY 1223, PHY 1233, or equiv.
- CHM 1382 Physical Chemistry 2** 3 QH
Continues chemical thermodynamics, kinetics, and transport processes. Covers theoretical concepts and practical applications of phase equilibria, quantitative use of phase diagrams, kinetic molecular theory and applications to transport processes, reaction kinetics, and mechanism. *Prereq.* CHM 1381.
- CHM 1383 Physical Chemistry 3** 3 QH
Presents the fundamental principles of quantum mechanics and their application to chemical problems. Emphasizes applications to atomic and molecular spectroscopy. *Prereq.* CHM 1382.
- CHM 1394 Experimental Physical Chemistry 1** 2 QH
Presents experiments that demonstrate simple yet accurate ways of measuring fundamental physical chemical phenomena. Examines treating experimental methodology and error analysis. Introduces computer-based data analysis. Emphasizes the preparation of concise and literate laboratory reports. Lab fee. *Prereq.* CHM 1381 or taken concurrently.
- CHM 1395 Experimental Physical Chemistry 2** 2 QH
Examines experiments based on various physical chemistry topics presented in CHM 1382. Explains and demonstrates computer interfacing of experimental apparatus. Focuses on data analysis using computer-based spread sheet and analysis programs. Emphasizes preparing concise and literate laboratory reports. Lab fee. *Prereq.* CHM 1382 or taken concurrently.
- CHM 1396 Experimental Physical Chemistry 3** 2 QH
Focuses on experiments in atomic and molecular spectroscopy and molecular photophysics that illustrate the principles discussed in CHM 1383. Emphasizes experimental methodology and preparing reports. Lab fee. *Prereq.* CHM 1383 or taken concurrently.
- CHM 1422 Instrumental Methods of Analysis** 4 QH
For chemistry majors and selected students in other majors. Covers principles, methods, and applications of electroanalytical chemistry, optical spectroscopy, and chromatography. Includes selected topics in instrumental design and function and in nonoptical spectroscopy. *Prereq.* CHM 1382 and CHM 1231, or permission of instructor. Chemistry majors take CHM 1432 concurrently.
- CHM 1432 Instrumental Analysis Laboratory** 2 QH
For chemistry majors and selected students in other majors registered for CHM 1422. Focuses on lab experiments related to topics covered in CHM 1422. Lab fee.
- CHM 1441 Inorganic Chemistry** 4 QH
Topics include atomic properties of free atoms and ions; ionic bonding and the structure of the solid state; the Madelung calculation; the Born-Haber and other thermodynamic cycles; valence-bond, molecular, orbital, and crystal field theories of bonding; stereochemistry of compounds of representative elements; electron-deficient compounds; and spectral and magnetic properties of transition metal compounds. *Prereq.* CHM 1383.
- CHM 1451 Experimental Inorganic Chemistry** 2 QH
Presents topics in modern inorganic and organometallic chemistry. Introduces important experimental techniques. Lab Fee. *Prereq.* CHM 1441 or taken concurrently.
- CHM 1461 Identification of Organic Compounds** 3 QH
Examines qualitative analysis of organic compounds and mixtures, using physical, chemical, and instrumental methods. Lab fee. *Prereq.* CHM 1265 or CHM 1273.

CHM 1491, CHM 1492 Directed Study	2 QH each
Offers independent work under the direction of a faculty member. <i>Prereq.</i> An organic chemistry sequence, and analytical chemistry and departmental approval.	
CHM 1521 Advanced Analytical Chemistry 1	3 QH
Examines analytical separations. Corresponds to CHM 3521. <i>Prereq.</i> CHM 1422 or equiv.	
CHM 1523 Advanced Analytical Chemistry 2	3 QH
Examines the theory, practice, instrumentation, and application of selected electroanalytical methods of analysis. Corresponds to graduate course CHM 3523. <i>Prereq.</i> CHM 1422 or equiv.	
CHM 1525 Advanced Analytical Chemistry 3	3 QH
Covers optical methods of analysis. Corresponds to CHM 3525. <i>Prereq.</i> CHM 1422 or equiv.	
CHM 1561 Advanced Organic Chemistry 1	3 QH
Focuses on organic structure and reactions. Corresponds to graduate course CHM 3561. <i>Prereq.</i> CHM 1273 or CHM 1265.	
CHM 1562 Advanced Organic Chemistry 2	3 QH
Examines organic structure and reactions. Corresponds to graduate course CHM 3562. <i>Prereq.</i> CHM 1561.	
CHM 1563 Advanced Organic Chemistry 3	3 QH
Focuses on organic structure and properties. Corresponds to graduate course CHM 3563. <i>Prereq.</i> CHM 1562.	
CHM 1564 Spectrophotometric Identification of Organic Compounds	3 QH
Examines spectrophotometric identification of organic compounds. Corresponds to graduate course CHM 3564. <i>Prereq.</i> CHM 1273 or equiv.	
CHM 1581 Advanced Physical Chemistry 1	3 QH
Examines chemical thermodynamics. Corresponds to graduate course CHM 3581. <i>Prereq.</i> CHM 1383.	
CHM 1591 Advanced Physical Chemistry 2	3 QH
Focuses on atomic and molecular structure. Corresponds to graduate course CHM 3591. <i>Prereq.</i> CHM 1383.	
CHM 1738 General Chemistry Laboratory (Honors)	1 QH
Honors equivalent of CHM 1138.	
CHM 1741 General Chemistry 1 (Honors)	4 QH
Honors equivalent of CHM 1131.	
CHM 1742 General Chemistry 2 (Honors)	4 QH
Honors equivalent of CHM 1132.	
CHM 1751 General Chemistry 1 (Honors)	5 QH
Honors equivalent of CHM 1101.	
CHM 1752 General Chemistry 2 (Honors)	5 QH
Honors equivalent of CHM 1152.	
CHM 1800, CHM 1801, CHM 1802, CHM 1803, CHM 1804, CHM 1805 Undergraduate Research	4 QH each
Students may conduct original experimental work under the direction of a faculty member. A minimum of a two-quarter commitment and approval of the executive officer of the chemistry department are required. <i>Prereq.</i> Middler year standing or	

above, chemistry major status, and a minimum QPA of 2.8 in courses required for the major.

CHM 1811 Advanced Chemical Laboratory Practice 1 **4 QH**
Staff members direct lab projects in analytical, inorganic, organic, and physical chemistry. Lab fee. *Prereq.* CHM 1273, CHM 1395, CHM 1396, CHM 1422, and departmental approval.

CHM 1812 Advanced Chemical Laboratory Practice 2 **4 QH**
Students may continue lab projects from CHM 1811 or carry out new projects in different areas. Lab fee. *Prereq.* CHM 1811 and departmental approval.

CHM 1840, CHM 1841, CHM 1842, CHM 1843 **4 QH each**
Junior/Senior Honors Project
For details contact the honors office.

Communication Studies

CMN 1110 Voice and Articulation **4 QH**
Provides training in developing clear and articulate speech. Includes topics such as the physiology of the vocal mechanism, voice projection and variety, articulation and pronunciation, and appropriate speech. Trains students through lectures, drills, and exercises.

CMN 1111 Oral Interpretation of Literature **4 QH**
Teaches the theory and skill of dramatic reading, with an emphasis on analyzing and presenting literature orally. Analyzes prose, poetry, and dramatic selections to communicate the author's meaning through voice, tone, and gesture.

CMN 1115 Foundations of Communications **4 QH**
Explores the history and nature of human interaction through speech. Includes such topics as the communication process; verbal and nonverbal; interpersonal, group, and public communication contexts; communication ethics; and the mass communication media. Offers the opportunity to learn principles governing effective communication.

CMN 1116 Public Speaking **4 QH**
Develops skills in public communication. Includes topics such as choosing and researching a topic, organizing and delivering a speech, handling speech anxiety, listening critically, and adapting language to an audience. Offers the opportunity for students to present a series of speeches and receive advice and criticism from an audience.

CMN 1210 Advanced Voice and Articulation **4 QH**
Develops the vocal techniques introduced in CMN 1110. Includes work with speech patterns and dialects. Develops the professional speaking voice through exercises and applying concepts. *Prereq.* CMN 1110.

CMN 1211 Advanced Oral Interpretation **4 QH**
Provides an in-depth study of analyzing and performing literature. Includes topics such as classical literature, group performance of literature, and programming. *Prereq.* CMN 1111.

CMN 1232 Communication and Gender **4 QH**
Reviews contemporary research in gender, specifically the role that gender plays in human communication. Includes topics such

as “genderlect,” gender bias in language, and gender images communicated in the media.

CMN 1239 Argumentation and Debate **4 QH**

Introduces the principles and skills of effective argument. Includes topics such as the process of advocacy, developing an argument through reasoning, the psychology of argument, and motivational techniques of argumentation. Combines theory and practice in argument through individual presentations and team debates. *Prereq.* CMN 1116 or permission of instructor.

CMN 1240 Advanced Studies in Speech Performance **4 QH**

Provides an opportunity to develop skills and strategies necessary to compete successfully on the forensics circuit. Designed for students in the forensics program. *Prereq.* Permission of instructor.

CMN 1250 Introduction to Mass Communication **4 QH**

Surveys the various media of communication. Includes radio, television, film, newspapers, magazines, and electronic communication. Explores the impact media have on society.

CMN 1300 Communication Theory **4 QH**

Surveys significant theories of human communication. Emphasizes such topics as systems theory, symbolic interaction theory, structuralist theories, and critical-cultural studies.

CMN 1310 The Classical Age of Speech and Rhetoric **4 QH**

Surveys theories of persuasive speech in ancient Greece and Rome. Includes Aristotle's rhetoric, Sophistic traditions, the rhetoric of Cicero and Quintilian, and famous speeches of the Golden Age of Athens. Teaches the roots of the discipline of speech and communication.

CMN 1315 Theories of Persuasion **4 QH**

Examines the behavioral theories used to create or modify beliefs, attitudes, and values. Studies how professional persuaders conceive of and execute arguments for specific audiences.

CMN 1317 The Audience in Mass Communication **4 QH**

Explores how mass media audiences interpret and actively use media messages and products as listeners, readers, and consumers. Examines the different stages of ethnographic research, audience meanings and interpretations, pleasure and fandom, the role of media in everyday life, and the use of ethnographic research methods in communications studies. *Prereq.* CMN 1250

CMN 1318 Negotiation Skills **4 QH**

Focuses on the process of negotiating mutually acceptable agreements in adversarial settings. Emphasizes collective bargaining as a form of problem solving, and resolving conflict through mediation. *Prereq.* Middler standing or above or permission of instructor.

CMN 1330 Interpersonal Communication **4 QH**

Helps students improve their interpersonal communications skills. Includes topics such as the self in communication, self-disclosure, language, nonverbal communication, listening skills, conflict resolution, and maintaining functional relationships through communication.

CMN 1331 Advanced Interpersonal Communication **4 QH**

Continues instruction in interpersonal communication. Focuses on applying principles of effective communication to human relationships. *Prereq.* CMN 1330.

CMN 1338 Group Discussion **4 QH**

Develops skills in working with and in small groups. Instructs in the small group decision-making process as well as in the interpersonal dynamics of the group. Includes topics such as problem solving, conflict resolution, role playing, and leadership.

CMN 1410 Contemporary Public Address **4 QH**

Analyzes significant public speeches from the recent past. Gives an opportunity to appreciate the role of oratory in major political and social movements by studying audio and videotapes of historic and influential speakers. Uses various critical theories to develop skills in criticism.

CMN 1415 Persuasion in Contemporary Culture **4 QH**

Develops students' critical thinking skills as receivers of persuasive communication. Examines instances of persuasion in popular culture such as advertising, mass media, and politics. Helps students become more informed, critical receivers of mediated messages. *Prereq.* CMN 1315 or permission of instructor.

CMN 1430 Organizational Communication **4 QH**

Surveys the communication process in complex organizations. Includes topics such as the evolution of organizational communication, communication networks, information management, and communication climate. Analyzes case studies and teaches how to improve the quality of communication in an organization. *Prereq.* CMN 1330 or permission of instructor.

CMN 1431 Advanced Organizational Communication **4 QH**

Examines the problems of sending and receiving information in complex organizations. Reviews technologies used to disseminate information, communication auditing processes, and methods to devise and assess communication programs for organizations. *Prereq.* CMN 1430.

CMN 1437 Consultation Skills **4 QH**

Surveys techniques used to analyze communication problems in industry, organizations, and groups. Includes theory and practice using the case study methods. Offers students the opportunity to learn how to audit an organization, identify problems in communication, and suggest solutions. *Prereq.* CMN 1115, CMN 1300, CMN 1330, and CMN 1338.

CMN 1450 Television Studio Production **4 QH**

Introduces studio production techniques. Covers the creative and technical elements of video production, camera operation, floor direction, editing graphics, lighting, picture composition, and directing methods. *Prereq.* CMN 1250 or permission of instructor.

CMN 1451 Foundations of Broadcast Technology **4 QH**

Surveys the history of radio and television broadcasting technology in the United States and around the world. Includes the evolution of technology, broadcast television versus cable and pay-per-view, effects of technology on the media, and the future of broadcast technology. Develops an understanding and appreciation of broadcast technology's impact on contemporary society.

CMN 1452 Radio Production **4 QH**

Introduces the principles and practices of radio. Includes lab work in studio production and instruction in program design, ratings, and on-air performance. Gives students an opportunity to produce broadcast material such as feature stories, commercials, and public service announcements. *Prereq.* CMN 1250 or permission of instructor.

CMN 1453 Broadcast Management**4 QH**

Examines the four critical functions of media management: economics, marketing, advertising, and ratings. Includes FCC regulatory policies, external market forces, and internal management forces. *Prereq.* CMN 1250 and middler standing or above.

CMN 1454 Programming for Radio and Television**4 QH**

Examines the history of radio and television programming and the structure in which programming operates. Covers network, network affiliate, independent, cable, and public television and radio, and the major suppliers of programs such as Hollywood studios, independent producers, syndicates, networks, and local stations. Reviews how the practical components of the program marketplace, such as rating, scheduling, regulation, and advertising, developed historically. Includes an opportunity to design a music wheel for radio and a short video segment for television.

CMN 1455 Television Field Production**4 QH**

Offers advanced training in video production techniques, emphasizing remote location shooting. Includes location scouting, production budgets, writing techniques, equipment location, post-production editing, and content analysis. Offers the opportunity to work in teams to produce and direct television using remote video equipment. *Prereq.* CMN 1250 and CMN 1450.

CMN 1500 Special Topics in Communication Studies**4 QH**

Examines various contemporary issues in communication studies. Course content to be posted in communication studies department prior to quarter in which it is offered. *Please consult prior to registering.*

CMN 1554 Special Topics in Media**4 QH**

Examines various contemporary issues in mass media.

CMN 1555 Communication and the Quality of Life**4 QH**

Exposes students to the role that communication plays in the quality of individual and community life. Helps students explore the impact of contemporary communication trends. Analyzes the impact of various media on quality of life. *Prereq.* Middler standing, CMN 1330, or permission of instructor.

CMN 1600 Introduction to Communication Research**4 QH**

Introduces the various methods through which scholars of communication develop knowledge. Includes historical, descriptive, experimental, and ethnographic methods. Expects student to engage in individual research projects designed to increase familiarity with communication literature and to develop skills in critical writing and library research. *Prereq.* CMN 1330 or permission of instructor.

CMN 1610 Rhetorical Criticism**4 QH**

Offers a critical analysis of a range of rhetorical texts: visual, literary, oral, and musical. Includes traditional and cultural approaches to criticism. (V) *Prereq.* CMN 1330.

**CMN 1800, CMN 1801, CMN 1802, CMN 1803
Junior/Senior Honors Project****4 QH each**

For details contact the honors office.

CMN 1890, CMN 1891, CMN 1892 Directed Study**4 QH each**

Prereq. Permission of instructor.

CMN 1893 Directed Study**1 QH**

Prereq. Permission of instructor.

CMN 1894 Directed Study**2 QH**

Prereq. Permission of instructor.

CMN 1895 Internship in Speech Communication**4 QH**

Gives students the opportunity to gain hands-on experience in the communications industry. Requires prior approval by the internship director prior to registration. Further internship details are available in the department office.

Economics

Unless otherwise stated, there are no prerequisites for advanced economics courses. Where prerequisites are indicated, exceptions may be granted with the instructor's permission.

ECN 1001 Economic Problems and Perspectives**4 QH**

Studies the economic concepts and methods that are useful to an informed citizen for an understanding of modern social issues such as unemployment, inflation, poverty, crime, the environment, medical care, and international competitiveness. *Limited to students who have not taken ECN 1115 or ECN 1116. Cannot be used to meet any departmental requirement of the major.*

ECN 1115 Principles of Macroeconomics**4 QH**

Introduces macroeconomic analysis. Topics include the flow of national income, economic growth and fluctuation, the role of money and banking, and monetary and fiscal policies. Emphasizes the development of conceptual tools to analyze the economic problems facing modern society. (II)

ECN 1116 Principles of Microeconomics**4 QH**

Focuses on development of basic theory of demand, supply, and market price. Explores applications to selected microeconomic problems, such as basic monopoly and competition, and other issues that relate to the role of the pricing system in resource allocation and income distribution. (II)

ECN 1130 Medical Economics**4 QH**

Examines health-care trends in the United States and selected foreign countries, causes of the rising costs of medical care, the particular nature of the demand for health-care services, the demand for physicians and paramedical personnel, Certificate of Need committees, health maintenance organizations, medical malpractice, increases in life expectancy and its impact on society, third-party payers, and the true cost of medical education.

ECN 1140 Economics of Crime**4 QH**

Covers economic analysis of crime and the criminal justice system. Topics include theoretical and empirical analysis of the economic causes of criminal behavior, the social costs of crime and its prevention, and design of enforcement policies.

ECN 1150 Economics of World Energy and Primary Resources**4 QH**

Investigates economic, political, and historical backgrounds of energy and other resources problems. Analyzes future impact of primary resources limitations on United States and world economics as well as feasibility studies of resource substitution. *Prereq.* ECN 1115 and ECN 1116.

ECN 1170 Economic Issues In Minority Communities**4 QH**

Examines the economic conditions of nonwhite minorities within the United States economy. Includes historical and cultural mate-

rials as well as specific theoretical and empirical analysis of the economic problems confronting minority communities. Same as AFR 1161. (VI)

ECN 1215 Macroeconomic Theory 4 QH

Investigates the conceptual and empirical problems of creating and using national accounts, price index problems, conceptual and empirical evaluation of consumption and investment functions and their policy implications, multiplier and accelerator models, and recent cyclical fluctuations. Analyzes theories of inflation, unemployment and growth in the light of recent economic history. *Prereq.* ECN 1115, and MTH 1114 or equiv.

ECN 1216 Microeconomic Theory 4 QH

Examines supply-and-demand analysis, various elasticity concepts and applications, theories of demand and production, and derivation of cost curves. Analyzes pricing and output behavior in the several market structures with their welfare implications and the pricing of resources. *Prereq.* ECN 1116, and MTH 1114 or equiv.

ECN 1250 Statistics I 4 QH

Discusses elementary set theory, basic probability, measurement and presentation of economic statistics, descriptive statistics, basic estimation techniques, testing statistical hypotheses, and sampling problems. *Economics majors who have earned credit for ECN 1250 may not receive credit for MSC 1200 or MTH 1152.*

ECN 1251 Statistics 2 4 QH

Topics include analysis of variance, correlation and linear regression analysis, multivariate regression analysis, and Bayesian decision making. *Prereq.* ECN 1250. *Economics majors who have earned credit for ECN 1251 may not receive credit for MSC 1201.*

ECN 1310 Labor Economics 4 QH

Focuses on economic analysis of the labor market and the labor force. Topics include the supply, development and efficient use of human resources; wage determination; the changing occupational and industrial structure; causes, nature and incidence of unemployment; the economic impact of unions, related labor market institutions and relevant public policies. *Prereq.* ECN 1116 or ECN 1115.

ECN 1311 Employment and Training Programs and Policies 4 QH

Examines the nature and objectives of employment and training programs, the nature and causes of human resource problems, current and previous efforts to solve human resource problems in the United States, planning of human resource programs, and economic evaluation of employment and training programs. *Prereq.* ECN 1115.

ECN 1312 Women in the Labor Market 4 QH

Focuses on economic analysis of the labor market position of women in the context of the changing economic structure and labor market institutions. Analyzes female labor force participation differences; male/female differentials in earnings and unemployment; occupational concentration, occupational segregation, theories and evidence of sex discrimination; and new opportunities for women. *Prereq.* ECN 1115 and ECN 1116.

ECN 1314 Economics of Education and Human Capital 4 QH

Explores theoretical and empirical treatment of economic issues related to education and job training, including formal education

(preschool through post-secondary), vocational education, on-the-job training, and government-sponsored employment and training programs. Emphasizes follow-up studies, cost-effectiveness analysis, and benefit-cost analysis for determining the effectiveness of education and training investments from a private and social standpoint. *Prereq.* ECN 1116.

ECN 1315 Income Inequalities and Discrimination 4 QH

Focuses on economic analysis of income inequalities, poverty, and discrimination. Examines the causes of income inequality and the nature, causes and effects of poverty; economics of racial discrimination; and public welfare system and other income maintenance schemes. *Prereq.* ECN 1115 or ECN 1116.

ECN 1320 Urban Economics 4 QH

Studies urban growth and development, intermetropolitan location of business firms, regional shifts in economic activity, intrametropolitan location of firms and households, and land use patterns. *Prereq.* ECN 1116.

ECN 1321 Urban Economic Problems and Policies 4 QH

Continues ECN 1320 but may be taken separately. Focuses on economic analysis of selected urban problems such as housing, poverty, transportation, education, health, crime, and the urban environment. Discusses public policies relating to such problems. *Prereq.* ECN 1116.

ECN 1322 Economics of Transportation 4 QH

Covers transportation and land-use patterns; externalities; social costs and social benefits of various modes of transportation, ownership, regulations, and financing of various modes of transportation; and economics of new technology in transportation. *Prereq.* ECN 1116.

ECN 1323 Environmental Economics 4 QH

Applies the tools of economics to environmental issues. Explores taxonomy of environmental effects; externalities; the commons problem; taxation, regulations, marketable permits, and property rights as a solution; measuring benefits of cleaner air and water, noise abatement, and recreational areas; global issues including tropical deforestation and acid rain; the relevance of economics to the environmental debate. *Prereq.* ECN 1116.

ECN 1330 Development Economics 4 QH

Explores prospects for economic growth and development in poor nations as indicated by economic analysis and historical experience; social, cultural, and institutional determinants of growth; analysis of agriculture and development, the role of technological change, population; and foreign trade. (V)

ECN 1331 American Economic Development 4 QH

Studies economic development of the United States from the colonial period to the present, historical changes in economic institutions and technologies, with special attention to preconditions of industrialism; the American Industrial Revolution, its spread and socioeconomic consequences; the Great Depression and the subsequent rise of mixed economy and welfare state; and United States adjustments to postwar economic changes.

ECN 1332 Economic History of Less Developed Countries 4 QH

Considers the problems of initiating and sustaining economic development in selected Third World countries during the last two hundred years. Country-specific case studies cover the role of traditional economic structures, different development goals and

strategies, state policies, and international economic relations. *Prereq.* ECN 1115 and ECN 1116; ECN 1330 recommended.

ECN 1333 European Economic Development 4 QH

Discusses economic inheritance of the nineteenth century development of capitalism and laissez-faire; the aftermath of the Industrial Revolution, European overseas expansion, the world wars, and the dissolution of empires; American economic conquest and European integration; the future of less developed areas in southern Europe; environmental impact of industrialism and the implications of technological society. (III)

ECN 1334 Comparative Economics 4 QH

Emphasizes competing types of theoretical economic systems; analysis of organization and operation of currently existing types of communist, socialist, and capitalist economies; comparison and evaluation of economic behavior and performance of different economic systems. *Prereq.* ECN 1115 and ECN 1116.

ECN 1335 International Economics: Finance 4 QH

Introduces the workings of foreign exchange markets, balance of payments, fiscal and monetary policy in an open economy under different exchange rate regimes, international capital movements, and the international monetary system. *Prereq.* ECN 1115 or permission of instructor.

ECN 1336 International Economics: Trade 4QH

Examines trade theories and patterns, impact of trade on domestic factor prices, factor movements, and terms of trade. Explores welfare implications and political economy of alternative trade policies, such as free trade, tariffs, quotas, and custom unions. *Prereq.* ECN 1116 or permission of instructor.

ECN 1337 History of Economic Thought 4 QH

Traces the evolution of Western economic thought. Covers several important schools in economics, examining the questions economists raise and analytical methods they use to study human behavior. *Prereq.* ECN 1115 and ECN 1116.

ECN 1340 Government Expenditures: Structure and Evaluation 4 QH

Covers fiscal functions of government, fiscal institutions and politics, theory of social goods, public expenditure growth and structure, federal budget expenditure evaluation and cost-benefit case studies, fiscal federalism in theory and practice, and issues of public debt and deficit. *Prereq.* ECN 1116 or equiv.

ECN 1341 Financing of Government: Taxation and Debt 4 QH

Considers principles of taxation; problems of tax structure and reform at federal, state, and local levels; tax incidence; effects of taxation on economic efficiency and growth; negative income tax and social security finance; issues of public debt and deficit. *Prereq.* ECN 1116 or equiv.

ECN 1342 Money and Banking 4 QH

Studies the nature and the functions of money, credit, and the role of financial organizations in the United States economy. Emphasizes theories of banking, money supply, and monetary policy. *Prereq.* ECN 1115 or equiv.

ECN 1345 Business Cycles and Inflation 4 QH

Considers the theories of business cycles and inflation and an empirical application of these theories to current business cycle, inflation, and stagflation problems. *Prereq.* ECN 1115, ECN 1116, and ECN 1215.

ECN 1350 Introduction to Econometrics 4 QH

Presents an introduction to the methods of econometric analysis and forecasting. Covers ordinary least squares, piecewise regression, tests and corrections for serial correlation and heteroskedasticity, specification analysis, simultaneous equations systems, errors in variables, dynamic models and elementary forecasting. *Prereq.* ECN 1115, ECN 1116, and ECN 1251.

ECN 1351 Problems in Economic Research 4 QH

Examines research methods used by practicing economists. Discusses typical problems from applied areas of economics, including choice of modeling framework, problems of data collection, review of estimation techniques, interpretation of results, and development of static and dynamic adaptive policy models. *Prereq.* ECN 1115, ECN 1116, and ECN 1251.

ECN 1353 Introduction to Mathematics for Economists 4 QH

Introduces basic tools of mathematics, matrix algebra, differential and integral calculus and classical optimization, with special reference to economic applications. *Prereq.* ECN 1115 and ECN 1116.

ECN 1360 Managerial Economics 4 QH

Explores the application of economic principles and theory, by the use of case studies, to the solution of decision-making problems in such areas as demand forecasting, price policies, estimation and control of costs, financing of capital investments, and responses to government taxation and regulation policies. *Prereq.* ECN 1116.

ECN 1361 Social Control of Economic Activities 4 QH

Focuses on the development of the government's role in economic activities, examining the relationships between the government and industry, labor, agriculture, public utilities, and consumers. Traces the changing role of the government from a laissez-faire policy to one of direct intervention in the economy. Covers such topics as wage and price control, environment and antipollution policies, consumer protection, and conglomerate mergers.

ECN 1362 Industrial Organization and Public Policy 4 QH

Presents an analytic framework and empirical study of how the structure of industrial organization and conduct of sellers and buyers affects economic performance and welfare. Includes industrial examples and case studies. Examines antitrust as a public policy designed to promote better market performances. *Prereq.* ECN 1116.

ECN 1401 Advanced Economic Theory 4 QH

Covers advanced theoretical treatment of selected topics in micro- and macroeconomics. Recommended for students planning to take graduate economics. *Prereq.* ECN 1215 and ECN 1216.

ECN 1415 Selected Topics in Macroeconomics 4 QH

Studies macroeconomic issues. *Prereq.* Permission of instructor.

ECN 1416 Selected Topics in Microeconomics 4 QH

Studies microeconomic issues. *Prereq.* Permission of instructor.

ECN 1481 Directed Study 1 QH

Offers independent work on a chosen topic under the direction of a faculty member of the department. Should not be substituted for the course requirements leading to a BA or BS degree in economics. Up to four quarter hours per offering, with an eight quar-

ter-hour maximum. *Prereq.* Qualified senior economics majors and approval of department chair.

ECN 1482 Directed Study 2 QH
Offers independent work on a chosen topic under the direction of a faculty member of the department. Should not be substituted for the course requirements leading to a BA or BS degree in economics. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq.* Qualified senior economics majors and approval of department chair.

ECN 1483 Directed Study 3 QH
Offers independent work on a chosen topic under the direction of a faculty member of the department. Should not be substituted for the course requirements leading to a BA or BS degree in economics. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq.* Qualified senior economics majors and approval of department chair.

ECN 1484 Directed Study 4 QH
Offers independent work on a chosen topic under the direction of a faculty member of the department. Should not be substituted for the course requirements leading to a BA or BS degree in economics. Up to four quarter hours per offering, with an eight quarter-hour maximum. *Prereq.* Qualified senior economics majors and approval of department chair.

ECN 1492 Senior Economics Seminar 4 QH
Coordinates and applies economic concepts, methodology, and data to issues and problems of broad social, economic, and philosophical importance. *Prereq.* ECN 1216 and ECN 1215; senior economics majors only.

ECN 1495, ECN 1496, ECN 1497, ECN 1498 4 QH each
Junior/Senior Honors Project
For details contact the honors office.

ECN 1715 Macroeconomics Principles (Honors) 4 QH
Honors equivalent of ECN 1115.

ECN 1716 Microeconomics Principles (Honors) 4 QH
Honors equivalent of ECN 1116.

Education

ED 1003 Reading/Study Skills 1 4 QH
Provides instruction to students who demonstrate a need to be more efficient in comprehending and studying college textbooks and collateral reading assignments. Concentrates on techniques involved in understanding informative materials and introduces the evaluation of persuasive prose. In addition, presents suggestions on such topics as how to listen to and take summary notes on course lectures and how to set study goals and priorities consistent with course objectives.

ED 1004 Reading/Study Skills 2 4 QH
Continues topics introduced in ED 1003 and expands upon the analysis and interpretation of persuasive texts. Emphasizes reading imaginative prose for meaning and pleasure, preparing for and taking examinations, and learning to adjust reading speed and method to various materials encountered in concurrent courses.

ED 1005 Practicum in Reading and Study Skills 4 QH
Gives students in the academic program Project Ujima comprehensive tools to help them to master the how-to's of reading textbooks, notetaking, outlining, introductory research skills, time management, studying skills, and other techniques necessary for success in college.

ED 1100 Education and Social Science 4 QH
Draws on anthropology, psychology, and sociology, and some of the concepts, methods, and terminology of those fields. Concentrates on the evolution of human nature, the influence of previous experience and learning on the behavior of individuals and groups, the difficulties in achieving a full degree of humanity in a technological society, and the potentially powerful roles that "professional socializers" (teachers, clinicians, group leaders, and so forth) can play in the lives of students and clients.

ED 1101 Education for the Future 4 QH
Discusses human survival and continued development as problems of educating people to use their skills and abilities to live harmoniously. Examines the teaching and learning process used to transmit information and values from one generation to the next, and places these processes in the context of the past, present, and future of the American family and education. Approaches these issues with a creative and humanistic perspective.

ED 1102 Human Development and Learning I 4 QH
Surveys developmental processes from the prenatal period through preadolescence. Covers principles of physical, cognitive, language, social, and personality development and discusses the implications for childrearing and schooling.

ED 1103 Human Development and Learning 2 4 QH
Presents a basic overview of the continuity of human development in contemporary society, from the pre-adolescent period through adolescence, adulthood, middle age, and old age. Considers significant areas of growth, development, and adjustment for each period, including social, sexual, personality, motivational, and cognitive aspects.

ED 1104 Analysis of the Instructional Process 4 QH
Examines conflicting theories about the nature of teaching and learning. Evaluates the effects of traditional and innovative educational systems on learners. Identifies educational tools for describing, analyzing, and evaluating aspects of learning and teaching; refines students' use of those tools during sequential field observations and class meetings. Requires fieldwork.

ED 1105 Day Care and Nursery Schools: Social and Cultural Origins 4 QH
Explores the origins of the increased contemporary use of out-of-the-family child care arrangements in the United States and in selected European and third-world nations. Covers the interrelation of industrialization, technology, and family functioning; contrasting varieties of child care centers in operation today; and effects of the proliferation of child care centers on other aspects of society, such as neighborhood life, business, parents' lifestyles, elementary school curricula, government spending, and the job market in education and human services. Requires three to four hours per week of fieldwork in child care. *Prereq.* ED 1100 or equiv.

ED 1106 Creative Expression in Children**4 QH**

Assists students who are interested in working with children in a variety of settings. Focuses on the potential of creative expression in interpersonal communication and the relation of children's creative experiences to their cognitive, emotional, and social development. Provides the opportunity to acquire the hands-on experience and confidence to work with various media available for creative expression. *Prereq.* ED 1102.

ED 1300 Education and Psychosocial Development**4 QH**

Examines theories and research on the socialization functions of education. Covers the relative influence of early versus postchildhood socialization and the role of diverse educational experiences and institutions in personality development. *Prereq.* ED 1100 or equiv.

ED 1302 The Human Services Professions**4 QH**

Explores what a human service agency is, how it comes into being, how it grows and changes. Analyzes attitudes, values, skills, and knowledge of the human services worker and the reasons why people in modern society require human services assistance. Views human services from the eyes of clients as well as society as a whole. Requires fieldwork in a human service agency as well as a good deal of independent study. Required for all human services majors; open to other students on space-available basis. *Prereq.* ED 1100, SOC 1100, or equiv.

ED 1306 Measurement and Evaluation**4 QH**

Emphasizes evaluation techniques for use in the classroom and teaching-learning situations at all levels. Explores the importance of establishing behavioral objectives as a basis for evaluation. Places considerable emphasis on improving teacher-made tests, especially objective-type tests. Requires students to construct an objective test in their discipline for an instructional unit. Also reviews other evaluation techniques besides tests. Gives brief attention to standardized measurement instruments of ability and achievement as they may be used in the evaluation of pupil progress.

ED 1309 Intervention Strategies for the Human Services**4 QH**

Introduces the range of skills used in working with clients in the various helping professions such as counseling (individual and group), advocacy, rehabilitation, community organizing, and income maintenance. Utilizes role playing, simulations, and interviews with practicing professionals. Requires reading but not fieldwork. Intended as preparation for more specialized courses; required for human services majors but open to other students with appropriate backgrounds.

ED 1311 Case Management: Diagnosis and Treatment**4 QH**

Introduces the basic theory and skills of managing clients' treatment programs in a variety of institutional settings. Provides training in identifying the components of a psychosocial assessment. Examines common techniques of planned service delivery and resource coordination and reviews the entitlements available to clients of diverse needs and backgrounds. *Prereq.* PSY 1111 or SOC 1100.

ED 1318 Seminar in Early Childhood Development**4 QH**

Focuses on views of cognitive, personality, and social development during early childhood. Discusses the implications of these views. Requires each student to carry out a project in the field placement and report results to the seminar. *Prereq.* ED 1102.

ED 1319 Speech, Language, and Cognition in the Young Child**4 QH**

Provides an overview of normal speech and language development and its relationship to cognition in the young child. Describes speech-language and cognitive behaviors in a variety of disordered populations and outlines a team approach to treating such disorders. Uses a variety of case studies to describe the assessment and remediation of young children with speech and language disorders in the classroom. Team taught by faculty from the Department of Education and from the Department of Speech-Language Pathology and Audiology. Provides students an opportunity to understand the implications of disordered speech and language for classroom learning. *Prereq.* ED 1102.

ED 1405 Literature and Learning Materials for Children and Young Adults**4 QH**

Offers a comprehensive survey of the field of children's literature and literature for young adults. Although designed specifically for prospective teachers (and required of all Early Childhood and Elementary Education majors), may also be taken as an elective by all students. Surveys and evaluates examples of contemporary children's literature and other learning materials used in preschool, elementary, secondary, and remedial programs. Covers such recurring themes as racism and sexism in children's books, controversial books for young children, contemporary illustrators, and banned books.

ED 1406 Elementary Education Curriculum 1**4 QH**

Examines rationales for major curriculum movements in elementary education, emphasizing what current research predicts as reasonable directions to follow. Engages students in different but complementary experiences to demonstrate that an array of teaching strategies enables children to learn in ways compatible for them. Gives particular attention to using sensory approaches via visual art, music, and movement as a basis for integrated program design in all subject areas. Stresses the nature of the thinking processes underlying the activities, and ways to sensitize children to these processes. Team taught by specialists in the arts and a specialist in curriculum.

ED 1407 Elementary Education Curriculum 2**4 QH**

Describes and evaluates social studies curricula in use in elementary school. Develops criteria to select appropriate social studies content, skills, and attitudinal objectives. Expects students to use these criteria to develop social studies experiences that meet the developmental needs of learners and to shed light on the lives of individuals and groups within different cultural settings. *Prereq.* ED 1406.

ED 1410 Methods and Materials for Teaching Adolescents and Adults 1**4 QH**

Considers specific methods and materials appropriate to teaching adolescents and adults. Seeks to develop in the students an understanding of the complexities of the materials and methodology of the teaching-learning process, to encourage within students attitudes conducive to and identified with good tenets of teaching, and to foster in the students acceptance of the need to grow constantly and to be aware of the continuing development of the learning-teaching process. Requires fieldwork. *Prereq.* ED 1104.

ED 1411 Methods and Materials for Teaching Adolescents and Adults 2**4 QH**

Focuses on the various subject areas of teaching techniques of organizing and presenting lessons, developing teaching materials, using audiovisual equipment, developing and implementing evaluation instruments, and selecting appropriate materials within the field of interest. Requires fieldwork. *Prereq.* ED 1410.

ED 1412 Fundamentals of Curriculum Development 4 QH
Examines how goals and objectives are selected and priorities are determined. Analyzes methods for designing educational programs to meet specified goals, methods of evaluating educational outcomes in terms of the goals of the program, and techniques for modifying programs in the light of such performance.

ED 1414 Current Issues in Teaching the Gifted and Talented 4 QH
Examines issues that affect the type and quality of education available to the gifted and talented in the United States. Describes and evaluates various approaches and programs and reaches conclusions about their effectiveness. Examines research findings on the needs of this segment of the population of learners in order to provide some criteria for future curriculum development.

ED 1417 Student Teaching and Seminar 8 QH
Allows for full-time participation in a University-arranged and -supervised school program designed to analyze learning and teaching and to demonstrate, evaluate, and develop teaching skills. *Prereq.* Advanced professional sequence with minimum 2.5 QPA and C- in each certification course.

ED 1425 Elementary School Mathematics and Science 4 QH
Focuses on methods and materials of mathematics and science teaching for early childhood and elementary education majors. Provides the opportunity for university students to explore various strategies and materials of teaching mathematics and some content areas in science. Takes into account the development stages of children.

ED 1426 Fundamentals of Reading 4 QH
Introduces developmental reading for prospective early childhood and elementary teachers. Studies beginning reading, word recognition, comprehension, and study skills. Introduces materials of instruction, methods of teaching, testing, and grouping.

ED 1800 Directed Study 1 4 QH
This experience is provided for the student whose unique academic needs or interests cannot be adequately satisfied in any of the scheduled courses of the department. Preparation consists of approval of the supervising faculty member and the dean's office. Approval forms must be submitted to the dean's office during the quarter prior to registration for the directed study. *Prereq.* Permission of instructor.

ED 1801 Directed Study 2 4 QH
For students who have completed ED 1800.

English

Unless otherwise indicated, the prerequisite for upperclass courses is a freshman English sequence. For undergraduate students in the full-time day programs this means ENG 1110 and ENG 1111; ENG 1013, ENG 1014, and ENG 1111; ENG 1110, ENG 1014, and ENG 1111. For the College of Engineering, ENG 1111 and ENG 1113, and for international students, ENG 1004, ENG 1005, and ENG 1006.

ENG 1001 Intensive English as a Second Language 0 QH
Reviews English grammar to help non-native speakers to develop listening, speaking, reading, writing, and studying skills. Includes language lab and small-group tutorials.

ENG 1004 Fundamentals of English for Non-Native Speakers 4 QH
Provides intensive practice in composition with accent on accurate, intelligible writing and paragraphs organized around single, well-supported ideas. Encourages sentence-combining and vocabulary development, and gives special attention to individual writing needs. Includes prose readings, class discussion, and selective review of grammar. *Prereq.* Special placement for non-native speakers whose performance or scores indicate that their writing skills are not yet up to those required for ENG 1005.

ENG 1005 English for International Students 1 4 QH
Emphasizes the development of skills needed in writing clear, expository prose essays. Requires the regular writing and rewriting of essays of increasing length and complexity. Focuses on appropriate prose readings for discussion and analysis and introduces techniques preparatory to research writing. *Prereq.* ENG 1004 or special placement.

ENG 1006 English for International Students 2 4 QH
Introduces the study of literature through close reading and discussion of fiction, nonfiction, and poetry. Advances development of rhetorical techniques by requiring frequent essays written in relation to the readings and rewritten to improve content, organization, and diction. Provides guided experience with using outside sources and library materials for writing a term paper. *Prereq.* ENG 1005 or equiv.

ENG 1013 Fundamentals of English 1 4 QH
Offers an introduction to principles of the writing process. Emphasizes individualized assistance in generating and developing ideas, drafting, revising, and organizing and mastering the conventions of written English. *Prereq.* Special placement.

ENG 1014 Fundamentals of English 2 4 QH
Continues instruction in writing, emphasizing exposition, argument, and academic essay writing, as well as the conventions of English usage, punctuation, and syntax. Individualized assistance in invention, drafting, revision, and editing. *Prereq.* ENG 1013 or ENG 1110.

ENG 1110 Freshman English 1 4 QH
Focuses on the individual student's writing skills. Includes application of important principles of composing, logic, and rhetoric to exposition and argumentation. Reviews sentence structure, punctuation, and paragraphing. Analyzes essay forms and problems. Students receiving a grade of S must take ENG 1014.

ENG 1111 Freshman English 2 4 QH
Continues instruction in writing, with emphasis on expository methods of defining, describing, analyzing, persuading, and composing the research paper. Requires students to write lengthy critical essays based on consideration of primary and secondary materials. Focuses on poems, stories, and plays as the subject matter for discussion of writing technique and written assignments. ENG 1111 follows ENG 1110 and is required of all freshmen in the University. *Prereq.* ENG 1110 or ENG 1014.

ENG 1113 Great Themes in Literature 4 QH
Explores a theme in literature through a number of illustrative works from the past and the present. Develops techniques of research and documentation.

- ENG 1115 Poetry** 4 QH
Involves close reading of selected poems, study of critical terms, and practice in different critical approaches to poetry; examines techniques for reading a variety of poetic texts. (II)
- ENG 1116 Fiction** 4 QH
Involves close reading of selected novels and short stories, study of critical terms, and practice in different critical approaches to fiction. (II)
- ENG 1117 Drama** 4 QH
Involves close reading of selected plays, study of critical terms, and practice in different critical approaches to drama. (II)
- ENG 1118 Introduction to Language and Linguistics** 4 QH
Introduces students to their unconscious linguistic knowledge about sentence structure (syntax), meaning (semantics), word forms (morphology), and speech sounds (phonology). Examines other issues related to language such as the Black English/Standard English debate, women's and men's language, "talking" chimpanzees, "talking" computers, and the nature/nurture controversy. (II)
- ENG 1119 History of the English Language** 4 QH
Studies the development of modern English from Anglo-Saxon beginnings; effects of Scandinavian and Norman invasions; dialect geography; evolutionary changes, word formation, and borrowing; and origins of writing and problems of spelling. Readings include both formal and informal writings, literary selections, wills, journals, and private and public letters. (III)
- ENG 1120 Survey of English Literature 1** 4 QH
Surveys the major British writers and major literary forms and works from the Middle Ages to the end of the eighteenth century. Includes works by such writers as Chaucer, Spenser, Shakespeare, Milton, Pope, and Swift.
- ENG 1121 Survey of English Literature 2** 4 QH
Surveys the major British writers and major literary movements from the romantic period through the Victorian and modern periods to the present. Includes works by such writers as Wordsworth, Coleridge, Keats, Browning, Tennyson, Yeats, Lawrence, Lessing, and Beckett.
- ENG 1123 Survey of American Literature 1** 4 QH
Surveys the major American writers and major literary forms and works from the colonial period to the Civil War. Includes works by such writers as Bradstreet, Taylor, Cooper, Poe, Hawthorne, Melville, and Emerson.
- ENG 1124 Survey of American Literature 2** 4 QH
Surveys the major American writers and major literary forms and works from the Civil War to the mid-twentieth century. Includes works by such writers as Whitman, Dickinson, Twain, James, Hemingway, Fitzgerald, Faulkner, and Wright.
- ENG 1125 Technical Writing** 4 QH
Trains writers in the clear, unambiguous style of technical writing. Requires students to practice these skills by writing technical proposals, process descriptions, feasibility and program reports, and operators' manuals and by making oral presentations. Lab fee.
- ENG 1126 Backgrounds in English and American Literature** 4 QH
Examines in translation Greek, Roman, and biblical literature as background for literary study. Emphasizes the development of myth, genre, and theme. Readings include Homer, Virgil, Ovid, the most influential parts of the Bible, and Dante. (III)
- ENG 1275 Grammar for Journalists** 4 QH
Reviews the mechanics of newspaper and magazine prose. Emphasizes grammatical forms, punctuation, spelling, effective structures, and conventional usage. *Prereq. Journalism majors only.*
- ENG 1276 Science Fiction** 4 QH
Traces the development of various science fiction themes and approaches, from early man versus machine and love/hate relationships to alien close encounters of all kinds. From *Frankenstein* to most recent titles. Lab fee.
- ENG 1277 Topics in Science Fiction** 4 QH
Focuses on a single writer or group of writers (such as Wells or writers of contemporary American science fiction), a theme (such as women in science fiction or the future city), or a unifying idea (such as time travel or utopia/dystopia).
- ENG 1278 Modern Bestseller** 4 QH
Explores the function of quest, romance, and adventure in a selection of contemporary bestselling fiction.
- ENG 1279 The Modern Novel** 4 QH
Studies the major British and American novelists of the twentieth century. Considers theme and form in such authors as Lawrence, Woolf, Fitzgerald, Ellison, Doctorow, and Didion. (III)
- ENG 1280 Modern Drama** 4 QH
Studies the development of drama from realism to surrealism, from Ibsen to Beckett.
- ENG 1281 The Modern Short Story** 4 QH
Studies the short story from Poe to the present, including such writers as Joyce and Kafka, Hemingway and Flannery O'Connor.
- ENG 1283 Contemporary Fiction** 4 QH
Examines British and American writers from 1945 to the present, including such figures as Lessing, Burgess, Pynchon, and Barth. Emphasizes experimental and modernist authors.
- ENG 1285 Literature and the Law** 4 QH
Investigates the problems of crime and justice as reflected in literature, from ancient to contemporary works. The secondary focus is the law itself as literature, including explorations of case files and other legal material. The readings encourage students to discover the changing nature of the criminals—heroes or victims or villains—and to deal with the social, psychological, and political facts that define them.
- ENG 1286 Literature and Politics** 4 QH
Explores how authors from Sophocles to Mailer represent the religious, moral, and ethical conflicts arising from the acquisition, use, and misuse of political power. Considers literature in several categories: utopian, which establishes a conflict between the ideal and the real; satirical, which threatens a power structure by exposing it to scorn; analytic, which describes the rise to and fall

from power of individuals, parties, or states; and investigative, which takes the reader inside a power elite to observe its inner operations. Participants examine the difference between the ideal of government and its reality.

ENG 1287 The Literature of Science 4 QH

Examines historically the discovery methods and models of literature and science, exploring one or more of the following areas: the relationship of the methods and models of literature and science; the treatment of scientific methods and models in literature; the use of literary devices, techniques, and traditions in scientific texts. Readings will be drawn from historically significant scientific texts, literary texts, or some combination of these. (VI)

ENG 1288 Film and Text 4 QH

Studies either the similarities and differences between literary texts and film versions of those texts or the interrelations between film and literature as means of cultural expression during a specific historical period. For example, students might compare Doctorow's *Book of Daniel* to the film version, *Daniel*, or they might study books and movies of a period like the sixties that reflect the spirit of the era (*Catch-22*, *The Graduate*). Lab fee.

ENG 1289 Shakespeare on Film 4 QH

Examines the various treatments of Shakespeare's plays on film. Treats the technical aspects of film and how these are used by directors to transfer Shakespeare's plays from the stage to the screen. Lab fee.

ENG 1290 Topics in Film 4 QH

Studies a theme or problem (film and society, film and politics), a period in film history (American film from 1945 to the present), a film genre (the western, film noir), or a film director (Hitchcock, Coppola). Lab fee.

ENG 1293 Topics in Popular Culture 4 QH

Focuses on such topics as the soap opera, the western, and the police story; on a popular culture activity; or on a popular culture perspective.

ENG 1294 Modern Film 4 QH

A selection of major modern films from around the world will be studied from a thematic, cultural, and historical perspective. Special attention is given to political, social, ethical, and psychological issues, as well as to the way common human themes emerge in quite diverse cultures. The course also covers the basic procedures of film interpretation. Lab fee.

ENG 1300 Topics in Fiction 4 QH

Studies a particular kind of fiction, such as the novella; a problem in fiction, such as the role of the narrator; a particular group of fiction writers; or a theme in fiction.

ENG 1307 Approaches to Literature 4 QH

Examines ancient and modern theories of literature. Includes selections from the criticism of Plato, Aristotle and the Romantics, as well as from Marxist, Freudian, Jungian, and formalist theories.

ENG 1309 Topics in Literary Criticism 4 QH

Studies a specific problem method or school of criticism, such as structuralism or archetypal criticism.

ENG 1340 Writing Workshop 1 QH

Students will write one long paper, often in conjunction with an assigned paper in another course, that will be produced in a class booklet at the end of the quarter. The course emphasizes the writing process: multiple drafts, revision, editing, and publication. *Prereq.* Engineering student with at least 80 QH or permission of Middler Year Writing Office, 433 Holmes, 617-373-3964.

ENG 1350 Intermediate Writing 4 QH

Provides writing instruction in an interdisciplinary course in which students develop papers on topics relating to their majors. Led by English faculty, students will also read and respond to essays from various disciplines. Writing will be guided in stages from proposal through finished product. Lab fee.

ENG 1351 Creative Writing 4 QH

Gives the developing writer an opportunity to practice writing various forms of both poetry and prose. Features in-class discussion of student work.

ENG 1352 Advanced Writing 4 QH

Offers an opportunity for experienced writers to hone their skills and develop their interests in different forms and subjects. *Prereq.* ENG 1350 or permission of instructor.

ENG 1357 Poetry Workshop 4 QH

Advanced workshop in writing and examining original student poetry. Students experiment in established poetic forms and compose their own work. *Prereq.* ENG 1351 or permission of instructor.

ENG 1360 Topics in Writing: Reading and Writing Nonfiction 4 QH

Combines literary analysis and creative writing. Concentrates on subjects of twentieth-century nonfiction prose such as politics, science, "culture," athletics, and natural history. Considers authors such as Elizabeth Drew, Russell Baker, and Stephen Jay Gould.

ENG 1361 The Writing Process 4 QH

Explores writing in theory and practice. Students observe writers at work and tutor students in the Writing Center as part of the course work.

ENG 1362 Publication Arts 4 QH

Acquaints students with basic publishing skills. Each student chooses an area of specialization, such as fiction, medicine, law, or engineering, in order to develop skill in editing manuscripts.

ENG 1370 Technical Writing 2 4 QH

Offers an opportunity for students to develop technical writing skills in a particular subject or form. *Prereq.* ENG 1125 or permission of instructor.

ENG 1371 Writing for the Computer Industry 4 QH

Focuses on computer documentation, covering general information and operating and programming instructions. Includes graphics, layout, testing, and revision. *Prereq.* ENG 1125 or permission of instructor and one computer science course.

ENG 1381 Writing for the Professions: Business Administration 4 QH

Allows students to gain professional writing experience similar to that of the workplace. Relies on the process approach to writing and features an extended simulation, which integrates common written and oral communication through practical application. Lab fee.

- ENG 1382 Writing for the Professions: Criminal Justice** 4 QH
Provides students in the College of Criminal Justice with instruction in writing a variety of professional forms.
- ENG 1400 Topics in Genre** 4 QH
Explores the characteristics of a particular literary form over time through works by various authors.
- ENG 1401 Introduction to Syntax** 4 QH
Offers an introduction to syntax, the structural rules of a language. Develops and tests syntactic theory which, like other scientific theories, seeks to explain why things are the way they are. The question underlying the investigation is: how do the structures of language relate to the structure of the human mind? (V)
- ENG 1402 Grammars of English** 4 QH
Provides a study of the rules of sentence construction in English, contrasting the traditional framework with current linguistic models. Students will have the opportunity to prepose, postpose, and extrapose as they learn to manipulate grammatical constructs.
- ENG 1407 Introduction to Semantics** 4 QH
Focuses on meaning and how it is expressed in language—through words, sentence structure, intonation, stress patterns, and speech acts. How do content, logic, and speakers' and listeners' assumptions affect what sentences can mean? In what ways is linguistic meaning determined by our perceptual system or our culture?
- ENG 1408 Topics in Linguistics** 4 QH
Examines closely one of a range of topics from the perspective of current linguistics: American dialects, language and law, women's and men's language, words and word structures, or issues in linguistics and literature.
- ENG 1409 American Novels 1** 4 QH
Focuses on the themes, forms, and techniques of major American novelists of the nineteenth and early twentieth centuries, such as Cooper, Hawthorne, Melville, Twain, and James.
- ENG 1410 American Novels 2** 4 QH
Studies the modern and contemporary American novel. Considers such writers as Cather, Hemingway, Fitzgerald, Faulkner, Bellow, and Baldwin. (III)
- ENG 1411 English Drama 1** 4 QH
Surveys representative English drama, excluding Shakespeare, from *Everyman* to Goldsmith and Sheridan. Analyzes dramatic forms as well as the role of the Elizabethan theaters, dramatic conventions, audience content, and acting styles in Restoration farces.
- ENG 1412 English Drama 2** 4 QH
Surveys representative English drama of the nineteenth and twentieth centuries. Charts the development of the genre from the nineteenth century to the present and discusses themes and forms.
- ENG 1550 Psychology and the Novel** 4 QH
Concentrates on twentieth-century novels and short stories that stress individual behavior and motivation and reveal human mental and emotional processes. Includes such writers as Kafka, Dostoevski, Faulkner, Conrad, and Lawrence.
- ENG 1551 Gender Roles in Literature** 4 QH
Investigates the relation between sex roles and literary portrayals. Selections represent male and female writers and provide a culturally comparative perspective.
- ENG 1552 Fantasy** 4 QH
Studies the theory and practice of fantasy as found in the works of such writers as Swift, Carroll, C.S. Lewis, Orwell, and Tolkien.
- ENG 1557 Topics in Fantasy** 4 QH
Explores such areas as dreams, nightmares, and borderline states of consciousness in the works of such writers as Poe and Kafka.
- ENG 1558, ENG 1559 Literature in Context** 4 QH each
Attempts to place the writer in the context of a special theme. For example, students might discuss a group of authors influenced by their common interest in psychoanalysis, by their social consciousness, or by an interest in the Wild West and the settlement of America.
- ENG 1600, ENG 1601 Topics in Literature** 4 QH each
Experiments with subjects and themes such as the censored novel, the Holocaust, alienation, and popular song lyrics.
- ENG 1602, ENG 1607 Major Figure** 4 QH each
Examines in detail the work of one writer such as Mark Twain, Virginia Woolf, or Eugene O'Neill.
- ENG 1608 The City in Literature** 4 QH
Examines the city in literature as it has been depicted from ancient times to the present, from Plato to Barthelme. Discusses such themes as the city as a locus of evil, the city as a place of possibility, and the city as a center of art and an influence on creative form in an interdisciplinary fashion.
- ENG 1609 Contemporary American Literature** 4 QH
Studies major movements in American poetry and fiction since 1945. Considers such poets as Plath, Ginsberg, and Ashbery, and such novelists as Morrison, Pynchon, and Vonnegut.
- ENG 1610 Early American Literature** 4 QH
Examines American literature of the colonial and federal periods, including Bradford, Taylor, Edwards, Franklin, Wheatley, Irving, and Bryant.
- ENG 1611 New England Renaissance** 4 QH
Studies the development of a native tradition in the context of democratic and romantic attitudes toward experience and the paradox these attitudes reveal. Includes such writers as Emerson and Thoreau, Hawthorne, and Melville.
- ENG 1612 American Realism** 4 QH
Examines the realistic tradition in American literature, including local color and native humor, from the end of the Civil War to the turn of the century. Includes such writers as Twain, James, Howells, Crane, and Norris.
- ENG 1617 Modern American Literature** 4 QH
Studies major developments in American poetry and fiction from 1900 to 1945. Considers such poets as Frost, Eliot, Stevens, and Moore, and such novelists as Hemingway, Faulkner, Fitzgerald, and Porter.

ENG 1618 Children's Literature**4 QH**

Studies the history of children's literature in the English language, with special attention to matters such as genre theory and critical approaches. Includes such works as *Alice in Wonderland*, *Uncle Remus*, *Little Women*, and *The Wizard of Oz*.

ENG 1619 Topics in Children's Literature**4 QH**

Focuses closely on a specific collection of stories (such as *Grimm's Fairy Tales*), on a specific genre (such as boys' books), on a specific issue (such as the problem of evil), or on children's literature as a form of group socialization.

ENG 1621 Nineteenth-Century British Fiction**4 QH**

Studies theme and form in the major English novels of the nineteenth century, considering such authors as the Brontës, Charles Dickens, George Eliot, and Thomas Hardy.

ENG 1622 Major Twentieth-Century British Novelists**4 QH**

Introduces students to British fiction from Joseph Conrad to John Fowles, including such writers as D.H. Lawrence, Virginia Woolf, and others less well known. The aim of the course is to show how novels as artistic creations shape their own worlds while helping us to understand ourselves.

ENG 1627 Medieval English Literature**4 QH**

Surveys the major works of medieval English literature. Includes works such as *Sir Gawain*, *Piers Plowman*, and *Pearl*.

ENG 1628 Chaucer**4 QH**

Surveys the work of Chaucer, with particular emphasis on the *Canterbury Tales*.

ENG 1629 Topics in Chaucer**4 QH**

Examines closely a particular work or group of works (such as *Troilus and Criseyde*) or a theme (such as Chaucer's symbolism).

ENG 1630 Milton**4 QH**

Concentrates on Milton's *Paradise Lost*, with supplementary readings in his minor poetry and prose.

ENG 1631 Topics in Medieval Literature**4 QH**

Focuses on a genre (such as romance or debate literature), a theme (such as alchemy or King Arthur), or other narrow topics.

ENG 1632 Sixteenth-Century Literature**4 QH**

Concentrates on sonnets, love lyrics, and erotic narrative poetry, principally by Wyatt, Sidney, Marlowe, Spenser, and Shakespeare.

ENG 1637 Seventeenth-Century English Literature**4 QH**

Examines major writers of the period, such as Bacon and Jonson, Donne and Herbert, Milton and Dryden.

ENG 1639 Eighteenth-Century English Literature**4 QH**

Surveys the Augustan age of comic masterpieces. Includes such major writers as Pope, Addison, Steele, Swift, Goldsmith, Burns, Johnson, and Boswell.

ENG 1640 Topics in Eighteenth-Century Literature**4 QH**

Examines closely a single writer or group of writers (such as Fielding or the essayists), a genre (such as satire), a theme (such as reason and madness), or other narrow topics.

ENG 1641 Romantic Poetry**4 QH**

Surveys the development of English Romantic poetry, both in its lyric and longer forms, in Blake, Wordsworth, Coleridge, Byron, Shelley, and Keats. Emphasizes problems of belief and the relationship of the individual to the surrounding world of natural, social, and historical process. (V)

ENG 1647 Victorian Literature**4 QH**

Surveys the major issues and writers of Victorian England, considering such writers as Tennyson and Browning, Dickens and the Brontës, G.M. Hopkins, and Oscar Wilde.

ENG 1648 Topics in Victorian Literature**4 QH**

Examines closely a single writer or group of writers (such as Arnold or the fantasists) or a theme (such as the movement toward modernism or decadence).

ENG 1649 World Literature 1**4 QH**

Surveys world literature from the time of the Greeks through the Renaissance, from Homer to Cervantes.

ENG 1650 World Literature 2**4 QH**

Surveys world literature from the Renaissance through the modern period, from Voltaire to Brecht.

ENG 1652 Twentieth-Century English Literature**4 QH**

Surveys the best and most interesting work of twentieth-century British writers such as William Butler Yeats, D.H. Lawrence, W.H. Auden, Doris Lessing, and Iris Murdoch.

ENG 1658 Introduction to Shakespeare**4 QH**

Covers a selection of the major plays of Shakespeare, including both tragedies and comedies. (III)

ENG 1659 Shakespeare's Comedies**4 QH**

Studies the romantic comedies, problem comedies, and romances, ranging from *The Merchant of Venice* to *The Tempest*.

ENG 1660 Shakespeare's Tragedies**4 QH**

Studies the nature of the tragic hero, the questioning of social norms, and the landscape of chaos, ranging from *Julius Caesar* to *Coriolanus*.

ENG 1661 Topics in Shakespeare**4 QH**

Examines closely such topics as the history plays, Shakespeare in performance, the Shakespearean hero, and psychological approaches to Shakespeare.

ENG 1662 The Bible**4 QH**

Studies books of both the Old Testament and the New Testament as literature and as history.

ENG 1667 Modern Poetry**4 QH**

Studies the modernist tradition in American and British poetry. Considers such writers as Yeats, Hardy, Frost, Eliot, Stevens, Pound, Williams, and Cummings. (III)

ENG 1677 Contemporary Poetry**4 QH**

Studies developments in British and American poetry since 1945. Includes such writers as Plath, Ginsberg, Lowell, Bly, Ashbery, and Heaney. (VI)

ENG 1678 Early African-American Literature	4 QH	GEO 1121 Biological Oceanography	4 QH
Surveys the development and range of black American writers, emphasizing poetry and prose from early colonial times to the Civil War.		Covers the productivity of animal and plant life in the various zones of the ocean and the growing economic importance of the oceans as a source of food for the expanding world population.	
ENG 1679 Modern African-American Literature	4 QH	GEO 1122 New England Fishery Resources	4 QH
Surveys the development and range of black American writers, emphasizing poetry and prose from the post-Civil War period to the present.		Provides an overview of the fisheries industry of New England. Emphasizes environmental factors controlling the distribution, quality, and abundance of fisheries resources. Discusses the methods and the effects of direct human utilization of the resource as well as the indirect effects of pollution and habitat modification.	
ENG 1690, ENG 1691 Junior/Senior Seminar	4 QH each	GEO 1128 Geology of Oceans and Coasts	4 QH
(First preference given to students needing the course to complete the major.) Explores an important aspect of literature such as the writer and the audience, the tradition of the new, style and meaning, and the jazz age. Emphasizes independent research in a seminar setting.		Examines the relationship between the form of the ocean basins and their margins and the major processes forming them. Emphasizes local landforms, including New England beaches, spits, barrier islands, and the continental shelf. (II)	
ENG 1710 Freshman English 1 (Honors)	4 QH	GEO 1140 Environmental Geology	4 QH
Honors equivalent of ENG 1110.		Discusses how geologic processes acting at the Earth's surface interact with the human environment. Topics include river and ocean flooding, coastal erosion, landslides, land-use planning, and waste disposal.	
ENG 1711 Freshman English 2 (Honors)	4 QH	GEO 1141 Geological Hazards and Resources	4 QH
Honors equivalent of ENG 1111.		Discusses how geologic processes originating deep inside the Earth interact with the human environment. Topics include global crystal movements, volcanic and earthquake hazards, mineral resources, coal and oil, geothermal energy, resource management, and disposal of radioactive wastes. (II)	
ENG 1713 Great Themes in Literature (Honors)	4 QH	GEO 1154 Planetary Astronomy	4 QH
Honors equivalent of ENG 1113.		Focuses on astronomy of the solar system. Topics include description of the planets and other objects, with discussion of how our understanding has evolved from the days of naked-eye observation to the present era of interplanetary probes. (V)	
ENG 1721 Survey of English Literature 2 (Honors)	4 QH	GEO 1208 Age of Dinosaurs	4 QH
Honors equivalent of ENG 1121.		Focuses on major physical and biological events of the Mesozoic Era of earth history. Draws on evidence from the sedimentary rock record to provide a basis for interpretations of Mesozoic life, climates, mountain building, and paleogeography. Demonstrates principles of evolution and extinction through dinosaur paleobiology and history.	
ENG 1723 Survey of American Literature 1 (Honors)	4 QH	GEO 1212 Physical Geology	4 QH
Honors equivalent of ENG 1123.		Offers a systematic study of the materials comprising the Earth. Emphasizes the processes that form, transport, alter, and destroy rock, as well as the nature and development of landscape. (II)	
ENG 1725 Technical Writing (Honors)	4 QH	GEO 1213 Physical Geology Laboratory	1 QH
Honors equivalent of ENG 1125.		Optional lab for GEO 1212. Exercises pertain to mineral and rock identification and topographic and geologic map interpretation. Required for geology majors. <i>Prereq.</i> GEO 1212; may be taken concurrently.	
ENG 1750 Intermediate Writing (Honors)	4 QH	GEO 1222 Historical Geology	4 QH
Honors equivalent of ENG 1350.		Traces the physical and biological history of the earth through geologic time. Major topics are the origin and evolution of life, mountain building, and continental drift. (II)	
ENG 1758 Introduction to Shakespeare (Honors)	4 QH		
Honors equivalent of ENG 1658.			
ENG 1781 Writing for Business (Honors)	4 QH		
Honors equivalent of ENG 1381.			
ENG 1810, ENG 1811 Directed Study	4 QH each		
Geology			
GEO 1119 Marine Resources	4 QH		
Provides a qualitative and quantitative survey of renewable and nonrenewable resources from the sea. Aspects covered include offshore oil and gas utilization, marine minerals, tidal power, and coastal zone recreational resources, including polluted beaches and artificial fishing reefs.			
GEO 1120 Physical Oceanography	4 QH		
Provides a description of the physical properties and composition of sea water, waves, tides, and ocean currents. Discusses how these properties are measured by oceanographers and how they influence the earth's environment and climate.			

GEO 1223 Historical Geology Laboratory**1 QH**

Studies fossil representatives of major invertebrate phyla, application of fossils to studies of rock sequences, interpretation of geologic history from geologic maps and sedimentary rocks.

Prereq. GEO 1222; may be taken concurrently.

GEO 1250 Advanced General Geology**4 QH**

Offers an introduction to new and advanced concepts, theories, and hypotheses in geology through discussions, research papers, and individual projects. *Prereq. GEO 1212 and GEO 1222.*

GEO 1308 Petrology**5 QH**

The hand specimen and field identification of the common igneous, sedimentary, and metamorphic rocks. Considers the modes of origin and important properties of common rock types.

Prereq. GEO 1212.

GEO 1310 Descriptive Mineralogy**5 QH**

Provides a study of mineralogy, including crystallography and physical, chemical, and descriptive mineralogy of the common rock-forming minerals. *Prereq. Two quarters of chemistry.*

GEO 1311 Optical Crystallography**5 QH**

Studies the theory and practical methods of optical crystallography, including the basic techniques for determining the optical constants of crystals using the polarizing microscope and immersion media. *Prereq. GEO 1310.*

GEO 1312 Petrography**5 QH**

Topics include description and identification of rocks and rock-forming minerals using thin-sections and the petrographic microscope; discussion of textural and mineralogic relationships.

Prereq. GEO 1311.

GEO 1320 Field Geology**4 QH**

Focuses on field techniques as a working guide for the approach, pursuit, and solution of geologic problems. Considers such techniques as geologic map construction, stratigraphic section measurement, and field rock description. Lab consists of field research at a quarry, roadcut, or other geologic exposure. *Prereq. GEO 1212.*

GEO 1412 Geochemistry**4 QH**

Offers an evaluation of chemical processes important in the various geologic environments and their effects on the development of the lithosphere. *Prereq. One year of chemistry.*

GEO 1414 Igneous and Metamorphic Petrology**5 QH**

Covers the origin and distribution of igneous and metamorphic rocks as interpreted from their chemistry, mineralogy, and field relationships. Lab includes field and petrographic analysis of rock suites. *Prereq. GEO 1312.*

GEO 1418 Structural Geology**5 QH**

Covers the description and origin of large- and small-scale rock structures with emphasis on interpretation of the mechanics of deformation. Field and lab analyses of structural problems using maps, models, and rock specimens. *Prereq. GEO 1212 and GEO 1213.*

GEO 1420 Geophysics**4 QH**

Studies the basic techniques of reflection and refraction seismology, gravity, aeromagnetic, and heat-flow techniques and the information they provide on the structure, composition, and

dynamics of the Earth's interior. Emphasizes the application of these techniques to the search for economic minerals in the earth's crust. *Prereq. PHY 1231.*

GEO 1424 Stratigraphy**5 QH**

Offers a study of paleoenvironments and sedimentary-basin analysis based on sedimentary structures, stratigraphic sequences, and fossils. Emphasizes use of geologic sections, drill-cores, and well-logs. Includes lab interpretation of sedimentary rock suites, maps, and sections. *Prereq. GEO 1222.*

GEO 1428 Invertebrate Paleontology**5 QH**

Surveys major invertebrate phyla preserved in the fossil record. Discusses micro- and macro-evolutionary principles with consideration of adaptive and functional morphology and the role of paleoenvironments. Lab involves description and classification of fossil invertebrates. *Prereq. GEO 1222.*

GEO 1430 Sedimentation and Sedimentary Environments**5 QH**

Describes the physical processes of sedimentation and their role in the interpretation of modern and ancient sedimentary environments. Lab concentrates on the interpretation and description of the physical and textural properties of sediments and sedimentary rocks.

GEO 1432 Sedimentary Petrology**5 QH**

Topics include origin, classification, and petrography of the major groups of sedimentary rocks. Discusses the environments of deposition of the nonclastic rocks. Lab concentrates on thin-section study of sedimentary rocks. *Prereq. GEO 1311.*

GEO 1435 Coastal Processes**5 QH**

Examines the effect of coastal marine processes and the resultant coastal responses. Topics include the dynamics of waves and currents and the associated erosion, transportation, and deposition of sediment, forming beaches, barrier islands, and cliffed structures. *Prereq. GEO 1212.*

GEO 1436 Marine Geology**4 QH**

Compares the balance between major sedimentary and tectonic forces in ocean basins and margins to resulting ocean form. Topics include origin of continental shelves, shelf sedimentation and transport, deep-sea processes and sediments. Evaluates resource development of OCS oil, sand and gravel, and manganese nodules. *Prereq. GEO 1212.*

GEO 1438 Geology and Land-Use Planning**4 QH**

Studies the causes and solutions of geologic environmental problems related to land use. Topics include the causes and prevention of land-use problems in areas of existing or potential landslides, subsidence, erosion, flooding, and groundwater pollution. *Prereq. GEO 1140, GEO 1212, or permission of instructor.*

GEO 1440 Geomorphology**5 QH**

Focuses on the origin and evolution of landscape features by processes operating at or near the Earth's surface. *Prereq. GEO 1212.*

GEO 1442 Water in Environmental Planning**4 QH**

Examines aspects of surface runoff from geomorphic and hydrologic perspectives. Develops methods for description and calculation of major river and drainage basin processes and applies the results to the planning process. Examines human modification of these systems, including urbanization, dams, and channelization,

and applies this information to an understanding of regulatory processes. (VI) *Prereq.* GEO 1212 or permission of instructor.

GEO 1444 Glacial and Pleistocene Geology 5 QH

Covers the processes of ice movement and the characteristics and distribution of erosional and depositional structures associated with past and present glaciers; introduces Pleistocene chronology and correlations. *Prereq.* GEO 1222.

GEO 1446 Hydrogeology 4 QH

Covers origin, distribution, and flow of groundwater in permeable sediments and bedrock; hydrological and geological characteristics of aquifers; regional flow systems emphasizing rock structure, stratigraphy, and other aspects of the geological environment; principles of hydrogeology mapping and analysis; and introduction to well design and well hydraulics. *Prereq.* GEO 1212, MTH 1107 or 1123, or permission of instructor.

GEO 1447 Groundwater Modeling 4 QH

Uses computers to solve problems in the flow of groundwater. Develops concepts of groundwater flow. Uses the finite-difference method to model steady-state and transient flow. Programs are supplied by the instructor so programming skill is not a prerequisite. *Prereq.* Introductory calculus.

GEO 1448 Groundwater Geochemistry 4 QH

Investigates important geological processes (formation of soil, ore deposits, caves, sinkholes) that occur when groundwater interacts with rock or soil, modifying groundwater chemistry and affecting water quality. Examines groundwater contamination and dispersion, isotope tracer studies, field sampling, and analytical methods. *Prereq.* Two quarters of chemistry.

GEO 1450 Geology Seminar 4 QH

Offers in-depth study, on an individual or small-group basis, of a selected geologic topic. Requires both oral and written presentations. *Prereq.* Major in geology or senior status.

GEO 1712 Physical Geology (Honors) 4 QH

Honors equivalent of GEO 1212. (II)

GEO 1722 Historical Geology (Honors) 4 QH

Honors equivalent of GEO 1222. (II)

GEO 1754 Planetary Astronomy (Honors) 4 QH

Honors equivalent of GEO 1154. (V)

GEO 1816, GEO 1817 Undergraduate Research 4 QH each

Offers independent research on a selected topic under the direct supervision of a faculty member. *Open only to juniors and seniors majoring in geology, with the recommendation of the supervising faculty member and of the department.*

GEO 1820, GEO 1821 Directed Study 4 QH each

Offers independent study of a specific topic not normally contained in the regular course offerings, but within the area of competence of a faculty member. *Open to all students with the recommendation of a faculty member and departmental approval.*

GEO 1824, GEO 1825 Special Studies 1 QH each

Offers independent study of a specific topic. *Open to all students with the recommendation of a faculty member and departmental approval.*

GEO 1830, GEO 1831, GEO 1832, GEO 1833

4 QH each

Junior/Senior Honors Project

For details contact the honors office.

History

HST 1101 Western Civilization to 1648 4 QH

Surveys Western lifestyles, events, institutions, and culture from the earliest human societies through the end of the Thirty Years War. Focuses on Bronze Age civilizations and the origins of universalist religions, Greco-Roman civilization, early Christianity, Islam, the Germanic and Arab successor states to Rome, medieval civilization, the Renaissance and the age of exploration, the Protestant and Catholic reformations, the religious wars that ensued, and the economic transformations that occurred simultaneously. Emphasizes those elements that influenced the development of Western civilization and values. (II) *Not open to students who have completed HST 1121 or HST 1701.*

HST 1102 Western Civilization since 1648 4 QH

Surveys the development of Western—largely European—society and values from the rise of the dynastic and bureaucratic states to current Soviet reforms and the integration of the western European economy. Covers royal absolutism, the rise of the scientific world view, the political and economic revolutions that transformed Europe at the end of the eighteenth century, the development of nationalism and Marxism, the race for colonies, the cultural transformations of the early twentieth century, World War I and the Russian Revolution, the crisis of capitalism and the rise of fascism, World War II and the Holocaust, the Cold War and decolonization, and the current state of Western civilization. (II) *Not open to students who have completed HST 1122 or HST 1702.*

HST 1121 World Civilization to 1648 4 QH

Surveys the development of human institutions from ancient times through the crisis of the mid-seventeenth century. Emphasizes the continuities and changes that occur within civilization and the similarities, differences, and relationships that exist among contemporary civilizations around the world. Covers such topics as the rise of the world's great religions, the military and trading relationships among the various regions of the ancient and medieval worlds, the economic and technological revival of Europe in the early modern period, and the expanding struggle for resources in the crisis atmosphere of the seventeenth century. *Not open to students who have completed HST 1101 or HST 1701.* (IV)

HST 1122 World Civilization since 1648 4 QH

Examines the world from 1648 to the present. Emphasizes the intellectual, technological, and political expansion of Europe and the reactions of the rest of the world. Covers such topics as the global development of modern dynastic and bureaucratic states; the expansion of the European economy with its attendant trade wars; imperial expansion and the explosion of the slave trade; the development and reaction of American Indian, Asian, and African civilizations to that imperialism; the sporadic extension and eclipse of colonialism; and the growing tensions between traditional patterns of loyalty and authority and national, regional, and even global systems and cultures as we approach the twenty-first century. *Not open to students who have completed HST 1102 or HST 1702.* (IV)

HST 1201 The United States to 1877**4 QH**

Focuses on the history of the American people from 1763 to 1877, with an analysis of the American Revolution and the major political, constitutional, diplomatic, economic, and social problems of the new nation. (II)

HST 1202 The United States since 1877**4 QH**

Continues the survey of American history, with discussion of the emergence of an industrial economy, an urban society, world responsibility, and expanded federal government. (II)

HST 1241 The Historian's Craft**4 QH**

Examines the ways in which the historian studies the past and the nature of historical statements. Problems considered include research techniques, changing conceptions of historical knowledge, and the relation between the historian and the society in which he/she works. (II)

HST 1251 Social Science Methodology**4 QH**

Offers an introduction to social science methodology and quantitative techniques used in historical analysis.

HST 1270 Introduction to Public History**4 QH**

Explores the field of public or applied history by surveying its components, including historic preservation, oral history, historical editing, historical archeology, genealogy, family history, business history, local history, material culture, historical resource management, museology, historical research for media, archival management, management of nonprofit organizations, and policy history.

HST 1301 Topics in European History (Group A or B)**4 QH**

Covers topics in European history from antiquity to the present.

HST 1321 Medieval Europe (Group A)**4 QH**

Topics include Europe from the barbarian invasions to the late thirteenth century; the expansion of Christianity and the institutionalization of church and papacy; the emergence of the Holy Roman Empire, England, and France as political units; and social, cultural, and economic developments. (III)

HST 1331 Renaissance Civilization (Group A)**4 QH**

Focuses on Europe from 1300 to 1500, when alternatives to medieval institutions became increasingly apparent. Gives special attention to political, economic, and cultural changes in Italy and northern Europe. (III)

HST 1355 Tudor England (Group A)**4 QH**

Provides a study of England from the late fifteenth to the early seventeenth century. Topics include an examination of the Tudor contribution to the development of political and social institutions; the Protestant Reformation and the relation between religion and politics; social and economic changes and their relation to the Elizabethan Renaissance. Particular emphasis is placed on intellectual and cultural developments and England's relation to Europe and the New World.

HST 1390 Population in European History (Group A or B)**4 QH**

Examines, through population studies, the causes and consequences of changes in human birth, death, marriage, and migration rates from the Old Stone Age to the late twentieth century. Discusses the interaction and impact of climate change, epidemic disease, war, economic development, and political policy, as well as changes in the structure and function of human family and child-rearing systems. (III)

HST 1393 History of Science and Technology (Group A or B)**4 QH**

Offers an interdisciplinary survey of the development of science and technology, integrating theories of the philosophy and sociology of science within a historical framework. Emphasizes the environmental and ideological conditions that contribute to the birth and growth of the various sciences and to the relation between these conditions and technological innovation.

HST 1395 History of Flight and Space Travel (Group A, B, or C)**4 QH**

Beginning with the dreams of flight of the ancient Greeks and Leonardo da Vinci, the course traces the history of nonpowered flight from the balloon experiments of the Montgolfier brothers to contemporary hang gliders; powered flight from the Wright brothers to the SST; and rocketry and space travel from its earliest beginnings to "Enterprise."

HST 1397 Health and Sickness: Historical Perspectives (Group A, B, C or D)**4 QH**

Surveys medical theories and the health care systems derived from them, from ancient times to the present. Studies medical theory and practice as related to the general history of the time and to the particular political, economic, or social circumstances that influenced health care institutions.

HST 1407 Europe, 1870-1921 (Group B)**4 QH**

Focuses on Europe from the Franco-Prussian War to the post-World War I settlement: the growing tensions and rivalries and the declining certainties of the end of the nineteenth century, the origins of World War I, the war itself, the Russian Revolution, and the Peace of Paris.

HST 1408 Europe since 1921 (Group B)**4 QH**

Focuses on Europe from the Versailles Settlement: the rise of totalitarianism, the Depression, the crises of liberalism and of the European mind, the Appeasement Era, World War II, the Cold War, the end of colonialism, and Europe today.

HST 1424 Victorian England (Group B)**4 QH**

Discusses the economic, social, and political life of the English people during Victoria's reign. (IV)

HST 1425 The Decline of Great Britain (Group B)**4 QH**

Discusses the economic, social, and political life of the English people in the twentieth century. (IV)

HST 1428 Irish Civilization (Group B)**4 QH**

Examines the history of Irish civilization from the earliest hero sagas and their impact on Irish values to the Irish independence movement, the prototype for many other twentieth-century liberation movements. (IV)

HST 1433 The French Revolution and Napoleon (Group B)**4 QH**

Examines the history of France in the age of the *ancien regime* and the Enlightenment as background for the French Revolution and Napoleon.

HST 1441 Hitler's Germany (Group B)**4 QH**

Offers a study of the origins and nature of Hitler's Third Reich, emphasizing the personal lives of Nazi leaders in an attempt to understand how seemingly ordinary people could enthusiastically promote wars of aggression and revel in genocidal policies.

HST 1472 The Family in European History (Group B)**4 QH**

Examines issues in the history of the European family from the late Middle Ages to the present. Topics include marriage and

sexuality, child-rearing practices, the effect of industrialization and revolution on family life, the Victorian family, and the evolution of the modern family. Students will prepare their own family histories.

HST 1473 Women in Modern Europe (Group B) 4 QH

Examines the situation of women in Western Europe from the French Revolution to the 1950s, focusing on France, Britain, and Germany. Topics explored include women in revolutionary movements, the impact of industrialization on women and the family, women in the labor movements, the struggle for suffrage, and the effects of world wars on women.

HST 1481 The Culture of Europe (Group B) 4 QH

Provides an analysis of the culture of the West in the nineteenth and twentieth centuries, focusing on the conjunction of social, cultural, and psychological forces that encouraged or retarded creativity. Considers the interconnections among the arts, social sciences, and sciences within each of the periods covered. (III)

HST 1485 Communism and Revolution (Group B) 4 QH

Focuses on the history of socialism and revolution from the early nineteenth-century utopias to the New Left of the 1960s.

HST 1490 Introduction to Women's Studies: Image, Myth, and Reality (Group B or C) 4 QH

Introduces the issues and methodology involved in the interdisciplinary study of women. Encompasses the historical, political, economic, and social processes that have created both the image and the reality of women in society. Uses guest lecturers to provide an overview of the many disciplinary approaches to the study of women. This course is required for women's studies minors and can be used as a general elective or, depending on the discipline of the coordinator, to satisfy specific concentration requirements. Same as SOC 1150 and INT 1150. (II)

HST 1491 Modern Western Economic History (Group B or C) 4 QH

Surveys the development of the Western world within the framework of economic theory, with attention to social and political ramifications. (III)

HST 1494 History and Film (Group B or C) 4 QH

Explores various historical issues as seen through the eyes of historians and filmmakers. Presents both acted and documentary films in combination with readings from a variety of source and interpretive materials. (II)

HST 1495 Technological Transformations of Society (Group B, C, or D) 4 QH

Examines the relation between technological innovations and the world in which they take place. Discusses conditions necessary for discovery and innovation and the impact of technology on political, economic, and social environments.

HST 1496 War in the Twentieth Century (Group B, C, or D) 4 QH

Provides an analysis of the causes, prosecutions, and effects of the major wars fought in the twentieth century, concentrating on the First and Second World Wars and on the Vietnam War. Using film, simulations, and other materials, classes explore the economic, social, cultural, and psychological impacts of these wars as well as their political, diplomatic, and material aspects.

HST 1497 The World since 1945 (Group B, C, or D) 4 QH

Offers a thematic study of issues and movements that have influenced the world's history since the end of the Second World War.

Subjects include the Cold War, the end of colonialism, urbanization, technology and ecology, cultures and counter-cultures, the "global village," and the prospects for human liberation.

HST 1501 Topics in American History (Group C) 4 QH

Covers special topics in the history of the people of the United States from 1789 to the present.

HST 1510 Colonial America (Group C) 4 QH

Covers the discovery and exploration of the New World, the settlement of the English colonies on the North American mainland, their development to 1763, and the origin of their clash with England. (III)

HST 1511 The American Revolution (Group C) 4 QH

Focuses on the coming of the American Revolution, its nature and progress, and its political, economic, and social aftermath.

HST 1514 The Civil War and Reconstruction (Group C) 4 QH

Focuses on the Civil War, its coming, its nature and progress, and the aftermath of Reconstruction.

HST 1516 The United States, 1898-1939 (Group C) 4 QH

Examines social, economic, political, and diplomatic changes from the Progressive Era through the Great Depression and the New Deal.

HST 1517 The United States, 1939-1960 (Group C) 4 QH

Examines social, economic, political, and diplomatic changes from the start of World War II to the election of John F. Kennedy.

HST 1518 The United States since 1960 (Group C) 4 QH

Examines social, economic, political, and diplomatic changes in the United States since 1960.

HST 1525 African-American History to 1900 (Group C) 4 QH

Provides an in-depth examination of the major topics that have shaped the African-American experience. Topics included are slavery and its effects, the role of the antebellum free black, the Civil War and Reconstruction, black response to the new racism of the late nineteenth century, and the W.E.B. DuBois-Booker T. Washington controversy. Same as AFR 1131. (III)

HST 1526 African-American History since 1900 (Group C) 4 QH

Examines the rising tide of African-American nationalism during the twentieth century, with special emphasis on the founding of the NAACP, the Garvey movement, the Harlem Renaissance, the founding of the Black Muslims, A. Philip Randolph's March on Washington movement, the rise of Martin Luther King, Jr., and the demand for change epitomized by the concept of Black Power. Same as AFR 1132.

HST 1531 New England History (Group C) 4 QH

Examines the history of New England from its first settlement by Native Americans to its condition in the late twentieth century. Encompasses a variety of topics, including geography, discovery, exploration, settlement, immigration, politics, industrialization, transportation, and urbanization.

HST 1533 History of Boston (Group C) 4 QH

Explores the history of Boston from colonial times to the present, with attention to the topographical growth and the ethnic composition of the city.

- HST 1539 American Jewish History (Group C)** 4 QH
Examines Jewish political, social, and cultural history from the arrival of the first group of Jews at New Amsterdam in 1654 to the present. Themes covered include immigration, assimilation, family life, religion, anti-Semitism, Zionism, the Holocaust, and American-Israeli relations.
- HST 1543 American Urban History (Group C)** 4 QH
Examines the development of urban society in the United States in the nineteenth and twentieth centuries, with emphasis on the effects of immigration and industrialization upon the politics, thought, and society of American cities. (VI)
- HST 1544 Environmental History of the United States (Group C)** 4 QH
Examines American attitudes and practices toward natural and artificial environments from the first exploration to the present, paying special attention to literature, art, and landscape design. (VI)
- HST 1548 American Cultural History to 1860** 4 QH
Studies the major issues in the cultural history of the United States from the seventeenth century to 1860. Topics covered include popular religion, the rise of republicanism, leisure and play, foodways, cross-currents of popular and elite literature and material culture, geographic sectional differences, and the crusade for the Union. Emphasizes the interaction of working-class, middle-class, and elite cultural forms, including music, sermons, literature, prints and paintings, and material culture.
- HST 1549 American Cultural History from 1860** 4 QH
Studies the major issues in the cultural history of the United States from 1860 to the present. Topics to be analyzed include the growth of a consumer culture, the problems of a perceived cultural decline at the turn of the century, technological perils and hopes, and strategies for physical, mental, and social renewal. Explores the impact and meaning of advertising as well as issues relating to the problems of individualism and community in a mass culture.
- HST 1553 The Family in American History (Group C)** 4 QH
Explores the history of the family, including the African-American family, in pre-modern and modern American society. Focuses on the traditional and modern roles of parents and children. Investigates patterns of sexuality, marriage, childrearing, work, play, death, and dying. Compares various family types, including elites, middle class, and indigent. Evaluates external forces affecting family structure and life, such as geographical mobility, industrialization, and warfare.
- HST 1554 Women in America (Group C)** 4 QH
Offers an analysis of women's economic and social roles from the colonial period to the present, with special attention to women's work, their roles in family and community, and nineteenth- and twentieth-century women's rights movements. (III)
- HST 1555 American Elites (Group C)** 4 QH
Examines the life of elite individuals and groups in American society, especially in the nineteenth and twentieth centuries.
- HST 1556 History of the American Home (Group C)** 4 QH
Studies the material culture of American vernacular homes from the settlement of the Massachusetts Bay Colony to the advent of the Great Depression. Develops an above-ground "archeology" of the American home to teach students how things—furnishings, buildings, landscape—can reveal unwritten details and meanings about everyday life. Includes the ways in which the broader political, economic, and social issues of the past were reflected and synthesized by Americans' physical surroundings.
- HST 1563 History of Sport in America (Group C)** 4 QH
Provides a history of the major sports and their impact on American life.
- HST 1575 History of Media in America (Group C)** 4 QH
Focuses on mass communication in American history, with attention to the role of books, newspapers, magazines, films, radio, and television.
- HST 1577 America and the Sea (Group C)** 4 QH
Studies the history of exploration and discovery of America, the development of fishing, the rise of ocean commerce, and the history of the American Navy.
- HST 1578 The Automobile in America (Group C)** 4 QH
Focuses on the impact of the automobile on American society in a historical context. Topics include the abandonment of traditional prohibitions of motorized carriages; the use of planning, taxes, and highway policies to foster the use of the automobile; the effect of the car on land use, recreation, and the economy; and contemporary issues such as pollution and energy.
- HST 1582 The Growth of American Government Since 1935 (Group C)** 4 QH
Examines the expansion of government from Roosevelt to the present, focusing on the reasons for the growth and its consequences, the development of major public policies, and the transformation of the federal role and politics.
- HST 1586 American Military History (Group C)** 4 QH
Surveys the complex relationship between American society and war, from the age of muskets to the neutron bomb.
- HST 1591 American Images of China (Group C or D)** 4 QH
Examines the relations between China and the United States, including the period of the missionaries and opium traders; the era of special privileges; the Open Door policy; the first half of the twentieth century, when China became America's favorite protégé; and the years of strain, warfare, and finally accommodation after the Chinese communists came to power in 1949.
- HST 1592 History of the Vietnam War (Group C or D)** 4 QH
Presents a history of military conflict in Vietnam with attention to the rise of the Viet Minh during World War II, the struggle against the French in the first Indochina war, the impact of the Cold War, and the involvement of the United States after 1950 in Laos and Cambodia as well as Vietnam. Emphasizes the roles of communism and nationalism in Indochina and the motives for American intervention. Films revealing American reaction to the escalating conflict will be shown.
- HST 1604 Modern Latin America (Group D)** 4 QH
Surveys Latin America from the mid-nineteenth century to the present. Topics include dictatorial republics and the continuation of poverty and injustice, the struggles toward democracy, the rise of nationalism, the threat of communism, and the relations between the United States and Latin America.
- HST 1605 The Modern Caribbean (Group D)** 4 QH
Topics include the successful Haitian revolt against slavery, peasant movements after the abolition of slavery, the Marcus Garvey movement, Caribbean music and art, the Cuban revolution, Black

Power, and American interventions in the Caribbean from the Spanish-American War to Grenada. Same as AFR 1297.

HST 1610 Topics in Asian History (Group D) 4 QH
Covers special topics in the history of Asia.

HST 1612 The Modern Middle East (Group D) 4 QH
Focuses on the Middle East since 1800, with emphasis on the background of present problems. (VI)

HST 1613 The Contemporary Middle East (Group D) 4 QH
Focuses on political, economic, and social developments in the Middle East since World War II.

HST 1614 The Middle East Today in Fact, Fiction, and Film (Group D) 4 QH
Presents a study of social, economic, and political changes and conflict in the lives of ordinary people who have been experiencing the recent crises reported in the media. Focuses on common experiences among various peoples—Turks, Armenians, Israelis, Arabs, and Iranians—and emphasizes significant themes: lifestyles, generational conflict, the changing role of women, ethnic or ideological conflict, and the prevalence of identity crises attending cultural and social disruption.

HST 1620 Early African Civilization (Group D) 4 QH
Studies the ancient empires of Africa, especially Chana, Songhai, Mali, Zimbabwe, the city-states of East Africa, and the Congo Kingdom. Includes Ethiopian and Egyptian history and controversies to 1800. Same as AFR 1191.

HST 1621 Modern African Civilization (Group D) 4 QH
Provides an introduction to modern Africa in the years from 1800 to 1960, showing how a new African civilization arose out of the conflict-ridden conditions imposed on the old. Themes include economic, social, political, religious, and artistic life, as well as the influences of slavery, colonialism, and nationalism. Same as AFR 1197. (IV)

HST 1623 West African History (Group D) 4 QH
Surveys the politics and economics of West Africa from the rise of the Mali Empire to the contemporary problems of national development for the countries from Senegal to Nigeria. Same as AFR 1403.

HST 1625 South African History (Group D) 4 QH
Presents the historical background to current conflict in the Republic of South Africa and in adjoining Mozambique, Zimbabwe, and Namibia. Examines the rise of the apartheid system—and the opposition and alternatives to it—through the themes of racial conflict, nationalism, and industrialization in this African setting. Same as AFR 1405. (VI)

HST 1633 Modern China (Group D) 4 QH
Explores the far-reaching political, economic, and social changes in China from 1800 to the present. Examines the decline of the empire, the impact of the West, the rise of nationalism, industrialization, the changing role of women, the origins of rural revolution, and establishing the Communist state.

HST 1634 Contemporary China (Group D) 4 QH
Examines Chinese polity, society, and economy from 1949 to the present, including the restructuring of urban and rural society in the 1950s, the rise of a new class, the emergence of factionalism, the Cultural Revolution, and the impact of the post-Mao economic and political reforms.

HST 1637 Modern Japan (Group D) 4 QH
Surveys the evolution of Japan from a third-world nation to a superpower. Major themes include the breakdown of feudalism, the impact of the West, the Meiji Restoration, industrialization, militarism, and Japan's post-World War II modern economic miracle.

HST 1644 Third World Women (Group D) 4 QH
Explores the role of women in the less-developed third world areas, with special emphasis on factors of change, development, and continuity. (IV)

HST 1652 Islam Resurgent (Group D) 4 QH
Analyzes what has been called "the militant revival of Islam" as a rallying point for reformist or revolutionary movements in the Muslim world. Includes little-known Muslim areas outside the Middle East in Africa and Asia. (VI)

HST 1701 Western Civilization 1 (Honors) 4 QH
Honors equivalent of HST 1101.

HST 1702 Western Civilization 2 (Honors) 4 QH
Honors equivalent of HST 1102.

HST 1711 America to 1877 (Honors) 4 QH
Honors equivalent of HST 1201.

HST 1712 America since 1877 (Honors) 4 QH
Honors equivalent of HST 1202.

HST 1790 Population in European History (Group A or B) (Honors) 4 QH
Honors equivalent of HST 1390.

HST 1801 Directed Study 4 QH

HST 1805 Approaches to History 4 QH
Requires students to undertake a major historical project based on the application of appropriate methodologies and upon the substantive understanding of a single subject chosen by the course instructor and announced in advance of the quarter. The course is rotated among the department's faculty. Required for all history majors but open to all upperclass students. *Prereq.* 80 quarter-hours of work.

HST 1811, HST 1812, HST 1813, HST 1814 4 QH each
Junior/Senior Honors Program
For details contact the honors office.

HST 1821 Fieldwork in History 1 4 QH
Offers directed work in historical societies, archives, museums, and other historical agencies. Students should consult the department for details. *Prereq.* HST 1101, HST 1102, HST 1201, HST 1202, and 16 QH in other history courses.

Interdisciplinary Courses

INT 1140 War and Conflict in the Nuclear Age 4 QH
Provides perspectives on the nature and effects of nuclear weapons and their impact on global politics. Explores differing views on policies that might prevent nuclear war.

INT 1150 Introduction to Women's Studies: Image, Myth, and Reality 4 QH
Surveys the issues and methodology involved in the interdisciplinary study of women. Encompasses the historical, political, eco-

conomic, and social processes that have created both the image and the reality of women in society. Guest lecturers provide an overview of the many different disciplinary approaches to the study of women. Required for women's studies minors; may be used as either a general elective or, depending upon the discipline of the coordinator, to satisfy specific concentration requirements. Same as SOC 1150. (II)

INT 1201 An Analysis of American Racism 4 QH

Discusses the cycle by which racism in our institutions helps form our attitudes and the manner in which our attitudes, in turn, shape our institutions. Emphasizes the practical, day-to-day aspects of racism, rather than the theoretical and historical.

INT 1215 Into the Ocean World 4 QH

A comprehensive interdisciplinary introduction to the oceans, focuses on the seas' complexity and the far-reaching consequences of our interactions with them. Draws on specialists in the sciences, social sciences, humanities, and arts, each with an interest in marine issues and a commitment to bridging the gaps among disciplines. The course themes are as broad as the oceans, but, when appropriate, we focus on Boston Harbor, a first step into the ocean world for those of us in this area. *Prereq.*

Permission of instructor.

INT 1216 A History of Seafaring 4 QH

Surveys maritime transportation, trade, travel, exploration, and warfare from approximately 3500 B.C. to the end of the wooden boat era in the late nineteenth century. Prior to the widespread application of steam power on land and sea in the nineteenth century, ships were the fastest, safest, and most economical means of transporting large cargoes over long distances. Literary and art history sources are also introduced, along with several films on maritime archaeology. *Prereq.* *Permission of instructor.*

INT 1217 Water: Planning for the Future 4 QH

Explores the ways in which water has affected our bodies, our planet, our history, and our culture, and the danger posed by increasing demand, waste, and pollution on our limited supply of usable fresh water. Considers water through scientific, historical, and cultural viewpoints, and surveys contemporary water problems in all their dimensions—political, economic, and technological. Same as SOC 1150. *Prereq.* *Permission of instructor.* (VI)

INT 1302 Female Perspectives on Society 4 QH

Examines social science and interdisciplinary feminist literature that focuses on women in families and work, and that deals with physical issues including violence against women and abortion. Incorporates the perspectives of women of color. Considers and evaluates women's views of social life as well as recognizes the difference among women. (VI)

INT 1320 Exploring the Humanities Through Film 4 QH

Investigates the ways in which the methods of the humanities can expand one's awareness of the sources, statements, and meanings of popular films. Presents series of movies for evaluation in the light of readings, the various approaches presented by faculty members from a number of humanistic disciplines, and students' own experience. (II)

INT 1321 Modernism: Art, Film, and Literature 4 QH

Examines the interrelation of film, art, and literature in the major movements of the twentieth century to 1939. Studies Futurism,

Cubism, Expressionism, Dada, and Surrealism, featuring European films, art, and literature in a comparatist perspective. Examines the persistence of modernist elements in contemporary art, literature, and film. Research paper or creative project due at the end of the term. Team-taught by members of the art, English, and modern languages departments.

INT 1333 Senior Seminar in Human Services 4 QH

Designed for seniors in human services, the course examines emerging roles and career options within the human services field. Study will focus on self-examination of attitudes and values affecting delivery of services, exploration of ethical issues and dilemmas relevant to human services, grantsmanship and funding issues, staff supervision and development within human services agencies, and refinement of group leadership skills.

INT 1336, INT 1337 Field Experience in Human Services 1 and 2 6 QH each

Human services students are required to fulfill two fieldwork placements during the last two years of their program. Each placement consists of 150 hours on-site and generally varies according to the students' interest. Examples of placement sites include community centers, nursing homes, vocational workshops, state and federal agencies for children, and recreational facilities. Experiences are supervised by University staff to maximize the students' learning opportunities. Junior or senior status, by permission only.

INT 1570 On Understanding Science 4 QH

Develops the quantitative and qualitative skills needed to critically read about science in newspapers and magazines. Examines the historical, philosophical, and social nature of science; units and scientific notation; technological developments of the last two hundred years; sources of information; and current scientific developments.

INT 1580 Physical Chemistry with Biological Applications 4 QH

Examines physiochemical principles as they apply to biological processes. Topics include chemical equilibria, reaction kinetics, basic thermodynamics, oxidation-reduction reactions and bioenergetics, and transport. Emphasizes problem solving as a tool for learning, using a quantitative approach. Explains basic assumptions and limitations underlying principles; for the most part, however, rigorous derivations are avoided. Makes applications to basic experimental techniques in biochemistry by way of relevant biochemical examples. *Prereq.* BIO 1261.

INT 1700 War and Conflict in the Nuclear Age (Honors) 4 QH

Honors equivalent of INT 1140. Discusses the development of nuclear weapons. Explores the decisions leading to and the aftermath of the nuclear attack on Hiroshima and Nagasaki. Examines the Cold War and the growth of nuclear arsenals, the potential causes of a nuclear war and the probable effects, and this issue's moral questions. Evaluates strategies for preventing nuclear war. (VI)

INT 1702 War Work: The Experience of World War II (Honors) 4 QH

Examines the Second World War as an example of the impact external events can have on professions. This upperclass course is team-taught by faculty from various disciplines.

INT 1704 Northeastern in the 1960s (Honors) 4 QH

Explores how college life and curricula have changed over the past twenty years by studying the microcosm of Northeastern University. Involves research papers on topics such as curriculum

changes, student values as reflected in literature and folklore, and the Northeastern riots in comparative context.

INT 1705 Greek Language and Literature (Honors)

4 QH

Focuses on Attic Greek grammar and selections from Greek literature in the original language. Discussion of texts is major part of course.

INT 1706 Industrial Relations (Honors)

4 QH

Presents theories and applications of labor management relations through lectures and case discussions. Focuses on the development of American and European labor movements, emphasizing legal and economic factors. Topics include union objectives, organization, and structure; union government and democracy; collective bargaining; and management approaches to industrial relations.

INT 1707 Psychoanalytic Literature (Honors)

4 QH

Examines literature from a psychoanalytic perspective. Topics include Freud's theories, object relations, Lacan's theories, and Kohut's self-psychology. Discusses works by Charles Dickens, Franz Kafka, Virginia Woolf, Doris Lessing, and Anne Tyler.

INT 1710 Italy (Honors)

4 QH

Honors interdisciplinary seminar on the history, art and modern culture of Italy with a primary focus on Pisa and Florence.

INT 1721 Modernism: Art, Film, and Literature (Honors)

4 QH

Honors equivalent of INT 1321.

Journalism

JRN 1103 Newswriting 1

4 QH

Covers functions of the editorial department and procedures in obtaining and writing news stories. Offers extensive news writing and an introduction to interviewing. Legal issues defined. Typing skills required. *Prereq.* ENG 1275 with grade of C or better.

JRN 1104 Newswriting 2

4 QH

Offers practice in multi-source and breaking stories. Provides an introduction to government and court reporting, advanced work in interviewing, and experience in writing under deadline pressure. Discusses legal issues. *Prereq.* JRN 1103 with grade of C or better.

JRN 1206 Editing

4 QH

Provides practice in copy editing and headline writing. Presents assignments in photo selection, cropping, and outline writing. Introduces page layout. *Prereq.* JRN 1104 with grade of C or better.

JRN 1250 Interpreting the Day's News

4 QH

Considers the news of the day and the function of the newspaper, news magazine, and news broadcasts in American life. Topics include rights and responsibilities of the press and how news is gathered, processed, and disseminated by the various media. (VI) For nonmajors as well as majors.

JRN 1301 Basic Photojournalism

4 QH

Covers camera and darkroom procedures along with cropping, assignment techniques, theory, and photo caption methods. *Prereq.* JRN 1104.

JRN 1305 Techniques of Journalism

4 QH

Provides practice in writing in-depth and multiplesource stories requiring significant research. Provides an introduction to

investigative reporting, practice in feature writing, and a review of legal issues. *Prereq.* JRN 1104.

JRN 1320 Radio News Gathering and Reporting

4 QH

Covers writing and editing news for radio, with practice in interviewing, organizing news scripts, and integrating audio materials into broadcast. *Prereq.* JRN 1103.

JRN 1336 Public Relations Principles

4 QH

Presents the principles, history, and methods of public relations, processes of influencing public opinion, responsibilities of the public relations practitioner, and analyses of public relations programs. *Prereq.* Sophomore standing.

JRN 1350 Advertising Principles

4 QH

Covers the development, procedures, economic functions, and responsibilities of advertising: planning, research, production, and other elements that go into successful advertising. *Prereq.* Upperclass standing.

JRN 1421 Television Newswriting

4 QH

Covers writing for TV news as opposed to other news media, importance of the writer-reporter as field-producer and writer-producer, and terms and language used in the production of TV news shows. Includes actual individual production of news shows, field trips to TV stations, and guest lecturers from the TV news media. *Prereq.* JRN 1103.

JRN 1422 Television News Production

4 QH

Demonstrates techniques used by the electronic journalist and TV news producer. Provides the opportunity to build a TV news show and to do reporting with portable TV cameras and editing equipment. *Prereq.* JRN 1103 and JRN 1421.

JRN 1428 The Role of Journalism in Sports

4 QH

Offers an analysis of the impact of journalism on the institution of sports in this country and around the world. Considers sports reporting as a motivator and demotivator from Little League to college and professional levels. Looks at the effect of news media coverage on violence in organized sports, on America's physical fitness, and on other aspects of society.

JRN 1430 Fundamentals of Sports Reporting

4 QH

Applies principles of news reporting to covering men's and women's sports for print and broadcast media. Emphasizes using sports reference materials, developing contacts, interviewing, and structuring the sports story. Also discusses investigative reporting in sports. *Prereq.* JRN 1104.

JRN 1432 Local Government Reporting

4 QH

Discusses coverage of town/city government, with emphasis on the "beat" approach to reporting public affairs. Focuses on practical, in-the-field experience with town meetings, meetings of boards of selectmen, and other commissions and bodies transacting public business. *Prereq.* JRN 1104.

JRN 1440 Design and Graphics

4 QH

Applies layout and design principles to newspapers, magazines and other print media. Covers type faces, copy measuring, dummyming, photo sizing, and keeping copy flow charts. Applies design and graphics principles to advertising layout. *Prereq.* JRN 1206.

JRN 1451 Advertising Copy Writing

4 QH

Covers theory and techniques of creating advertising copy for newspapers, magazines, radio, television, and direct mail.

Emphasizes fact gathering, copy structure, and advertising design. *Prereq.* JRN 1103, and JRN 1350.

JRN 1460 Public Relations Problems 4 QH
Applies public relations techniques to actual problems; presents case studies in industry, labor, education, government, social welfare, and trade associations. *Prereq.* JRN 1336.

JRN 1501 History of Journalism 4 QH
Traces the development of American journalism from its European and English beginnings. Topics include the colonial press, the great personal journalists of the nineteenth century, and the impact of major technological changes in mass communications media in the twentieth century. Some writing required. *Prereq.* Upperclass standing.

JRN 1508 Law of the Press 4 QH
Examines legal problems of libel, invasion of privacy, and access to government information; discusses the balance between private rights and the public's "need to know." *Prereq.* Upperclass standing.

JRN 1512 Journalism Ethics and Issues 4 QH
Explores the responsibilities of news media and ethical issues confronting decision-makers in journalism. Examines the principles found in codes of the American Society of Newspaper Editors, the Associated Press Managing Editors, the Society of Professional Journalists, and other organizations. Some writing required.

JRN 1522 Magazine Writing 4 QH
Covers writing and free-lancing magazine articles; analyzing magazines as markets; and selecting the best feature format—how-to-do-it, profile, personal experience, human interest, interpretive pieces, and others. *Prereq.* JRN 1104.

JRN 1540 Sports Public Relations 4 QH
Covers the planning and implementing of public relations functions for professional, amateur, and recreational athletic organizations. Stresses use of journalistic research techniques, implementation of programs, and effective communication with news media and various publics. *Prereq.* JRN 1103, and JRN 1336.

JRN 1552 Advertising Practice 4 QH
Covers the preparation of advertising for print and broadcast media, including campaign planning and space and time buying and scheduling. Includes product research, consumer surveys, and measuring the effects of advertising. *Prereq.* JRN 1451.

JRN 1561 Public Relations Practice 4 QH
Demonstrates practices and techniques employed in the field, including organization of events and functions. Studies campaign planning, research, and media relationships. *Prereq.* JRN 1103 and JRN 1336.

JRN 1575 Publication Production and Management 4 QH
Examines the organizational structure, production methods, and management procedures of print media companies. Analyzes the interaction of business, advertising, production, and circulation departments. *Prereq.* JRN 1206.

JRN 1617 The Constitution and Mass Communications 4 QH
Explores the meaning of freedom of the press through study and discussion of the evolving First-Amendment interpretations of the United States Supreme Court. *Prereq.* Upperclass standing.

JRN 1703 Newswriting 1 (Honors) 4 QH
Honors equivalent of JRN 1103.

JRN 1704 Newswriting 2 (Honors) 4 QH
Honors equivalent of JRN 1104.

JRN 1870, JRN 1880 Seminar 4 QH
Offers discussions and readings on topics of current significance in various journalistic fields. *Prereq.* Upperclass standing.

JRN 1890, JRN 1891 Directed Study in Journalism 4 QH each
Prereq. Permission of instructor.

JRN 1892 Topics 4 QH
Prereq. Permission of instructor.

JRN 1894, JRN 1895, JRN 1896, JRN 1897 4 QH each
Junior/Senior Honors Project
For details contact the honors office.

Mathematics

MTH 1000 Mathematics Preliminaries 1 4 QH
Supplies, together with MTH 1010, the high school math background necessary for a student to enroll in MTH 1101, MTH 1106, or MTH 1113. Includes the arithmetic of signed numbers, fractions, decimals, and percents; algebraic manipulation and solution of simple equations; elementary word problems; and laws of exponents. *Prereq.* Permission of course coordinator.

MTH 1010 Mathematics Preliminaries 2 4 QH
Supplies, together with MTH 1000, the high school math background necessary for a student to survive in MTH 1101, MTH 1106, or MTH 1113. Includes quadratic equations and systems of equations; graphing (including slope of a line and vertex of a parabola), more word problems; logarithms, trigonometry, or some of both at the instructor's discretion. (In winter and spring quarters, the material covered in MTH 1000 is assumed; in the fall quarter, there is an overlap with MTH 1000 on solving equations, word problems, and laws of exponents.)

MTH 1101 Applications of Algebra 4 QH
Examines systems of linear equations and their graphs. Focuses on graphing systems of linear inequalities in two variables with application to linear programming. Introduction to matrices, matrix multiplication, and vectors. (I)

MTH 1103 Basic Probability 4 QH
Covers introduction to probability, sample spaces with equiprobable events, permutations and combinations, conditional probability. Also discusses random variables, introduction to Markov processes. Equiv. to MTH 1150.

MTH 1106 Functions and Algebra 4 QH
Examines how to solve various kinds of algebraic equations: linear, quadratic, and linear systems in two and three unknowns. Considers applications to word problems such as motion, mixture, and variational problems. Covers the concept of function, graphs, line slopes, and graphs of polynomials. Also discusses some elementary trigonometry and vectors in the plane. Students do not receive credit for this course if they have already received credit for MTH 1188 or MTH 1191.

MTH 1107 Functions and Basic Calculus**4 QH**

Introduces differential calculus. Examines elementary rules of differentiation with application to graph sketching and to maximum and minimum problems. Discusses exponential and logarithmic functions with applications to compound interest, population growth, and radioactive decay. (I) Students do not receive credit for MTH 1107 if they have already received credit for MTH 1114.

MTH 1108 Calculus**4 QH**

Offers a review and continuation of differential calculus, graphing and differentiation of trigonometric functions; also presents an introduction to integral calculus with applications to geometric problems and differential equations.

MTH 1113 College Mathematics for Business and Economics**4 QH**

Focuses on sets, rectangular coordinates and graphs, functions and functional notation, linear and quadratic functions, exponential and logarithmic functions, systems of linear equations, summations, inequalities, permutations and combinations, elementary probability concepts, arithmetic and geometric progressions, and simple and compound interest annuities. (I)

MTH 1114 Calculus for Business and Economics**4 QH**

Focuses on matrices; Gaussian elimination inverses of matrices; systems of linear inequalities; feasible regions; graphical solution of linear programming problems; limits; derivatives; differentiation of polynomials and of exponential and logarithmic functions; maxima, minima, and points of inflection; optimization in nonlinear problems; and marginal analysis of cost revenue and profit functions. (I) *Prereq. MTH 1113 or equiv. Students do not receive credit for MTH 1114 if they have already received credit for MTH 1107.*

MTH 1120, MTH 1121 Intensive Calculus 1 and 2**6 QH each**

Assists students in overcoming deficiencies in precalculus mathematics without losing ground in the MTH 1123 sequence. Reviews high school algebra, introduces trigonometric functions, and covers the material in MTH 1123 and MTH 1124. Includes lecture and homework review sessions. (Students placed in this course by request or on the basis of their College Board scores and the results of an orientation-week diagnostic test.)

MTH 1123 Calculus for Engineering Majors 1**4 QH**

Introduces the differential calculus of one variable, including trigonometric, exponential, and logarithmic functions, together with their graphs. Includes average rates of change, instantaneous rates of change, derivatives, and the chain rule. Covers curve sketching, applications of the derivative to problems involving related rates, and maxima and minima.

MTH 1124 Calculus for Engineering Majors 2**4 QH**

Introduces integral calculus including areas, volumes, and other applications. Studies integration involving trigonometric, inverse trigonometric, exponential, and logarithmic functions. Introduces differential equations. *Prereq. MTH 1123.*

MTH 1125 Calculus for Engineering Majors 3**4 QH**

Studies the calculus of elementary functions in the context of complex numbers. Includes infinite series as well as second order differential equations. *Prereq. MTH 1124.*

MTH 1133 Calculus for Biology Majors 1**4 QH**

Presents an introduction to calculus with applications to biology, ecology, and medicine. Includes differentiation, anti-differentiation, curve sketching, and exponential functions.

MTH 1134 Calculus for Biology Majors 2**4 QH**

Continues MTH 1133. Includes exponential growth and decay; integration and area; rules for differentiation; and functions of several variables, with LaGrange multipliers, total differentials, and the method of least squares. *Prereq. MTH 1133.*

MTH 1135 Calculus for Biology Majors 3**4 QH**

Continues MTH 1134. Includes the natural logarithm; trigonometric functions; techniques of integration, including numerical methods and differential equations, with separation of variables and qualitative methods. *Prereq. MTH 1134.*

MTH 1137 Discrete Mathematics 1**4 QH**

Examines proof methods: induction, case analysis, contradiction; binary, octal and hexadecimal numbers; modular arithmetic; sets, relations, equivalences, functions; combinations, permutations, elementary counting, and discrete probability; and elementary graph theory. *Prereq. MTH 1123.*

MTH 1140 Calculus for Science Majors 1**4 QH**

Presents introductory calculus primarily for mathematics, physics, and chemistry majors. Together with MTH 1141 and MTH 1142, includes derivatives and integrals of one-variable functions; applications to curve sketching, maxima and minima problems, area, moments, simple volumes, etc.; approximation methods, including numerical integration, root finding, Taylor series, and power series. Requires students to master the use of the computer to make value tables and plot curves and to implement simple numerical algorithms.

MTH 1141 Calculus for Science Majors 2**4 QH**

Continues MTH 1140. *Prereq. MTH 1140.*

MTH 1142 Calculus for Science Majors 3**4 QH**

Continues MTH 1141. *Prereq. MTH 1141.*

MTH 1150 Probability, Statistics, and the Computer**4 QH**

Presents a computer-oriented introduction to statistical methods, with applications in the social and life sciences. Examines descriptive statistics, elementary probability, correlation and regression, and the fundamentals of statistical inference (confidence intervals and hypothesis testing) with a minimum of mathematical derivations. Uses a statistical computer package such as MINITAB or SPSS to solve supplementary problems. Equivalent to MTH 1103. *Prereq. Nonmath majors.*

MTH 1152 Statistical Thinking**4 QH**

Introduces the statistical style of thinking for students without mathematical sophistication or who ordinarily don't like mathematics. Assigns readings will from a wide variety of sources. Uses extensive class discussion and homework problems (some on a computer) to teach students to use statistics and to critically evaluate the use of statistics by others. Covers descriptive statistics, statistical tests, confidence intervals, regression, and sampling. (II) *Economics majors do not receive credit for this course if they have already earned credit for ECN 1250 or MSC 1201.*

MTH 1183 Mainstreams of Mathematics**4 QH**

Traces the development of some key mathematical ideas, their historical context, and current applications. May include mathematical games and puzzles; number systems past and present; logic and computers; calculus and the rise of modern science, art, and symmetry; and cut-and-paste topology. Assumes no more than high school algebra and geometry. Encourages students with

diverse backgrounds to rediscover mathematics through individual projects, supplemental readings, and classroom discussions.

MTH 1188 Problem Solving and Pre-Calculus I **6 QH**

Develops basic algebraic and problem-solving skills in students who indicate these needs and are enrolled in this course rather than the four-credit MTH 1191. Together with MTH 1189, prepares the student for calculus (MTH 1193). Includes writing equations and relating word problems to equations, plotting linear equations, word problems involving algebraic fractions, algebraic operations, radicals, inequalities, functional notation and the graphing of functions. *Students who earn credit for this course may not receive credit for MTH 1106 or MTH 1191.*

MTH 1189 Problem Solving and Pre-Calculus 2 **6 QH**

Continues MTH 1188. Includes functions and graphing, composite functions and inverse functions, logarithmic and exponential functions and equations, trigonometric functions and their graphs, solving trigonometric problems, trigonometric identities, and vectors in two-dimensions. Equivalent to MTH 1192.

MTH 1191 College Algebra **4 QH**

Focuses on fundamental algebraic operations, complex numbers, radicals and exponents, functions, linear and quadratic equations, irrational equations, inequalities, variation, and roots of polynomial equations. *Prereq. BSET majors only. Students who earn credit for this course may not receive credit for MTH 1106 or MTH 1188.*

MTH 1192 Pre-Calculus **4 QH**

Focuses on logarithms, trigonometric functions of angles in degrees and radians, trigonometric identities and equations, right triangles, oblique triangles, complex numbers in trigonometric form, systems of equations, and determinants. Equivalent to MTH 1189. *Prereq. MTH 1191 or MTH 4107; BSET majors only.*

MTH 1193 Calculus I **4 QH**

Focuses on plane analytic geometry; differentiation of algebraic functions; rate, motion, maximum and minimum problems; derivatives of higher order; curve sketching; basics in functions, limits, and continuity. (Not equivalent to MTH 1123.) *Prereq. MTH 1192 or MTH 4108; BSET majors only.*

MTH 1194 Calculus 2 **4 QH**

Focuses on applications of derivatives to curve sketching; antidifferentiation; the definite integral, with applications; calculus of nonalgebraic functions — logarithmic, exponential, and trigonometric; calculus of inverse trigonometric functions; techniques of integration; indeterminate forms; and L'Hopital's rule. (Not equivalent to MTH 1124.) *Prereq. MTH 1193 or MTH 4120; BSET majors only.*

MTH 1195 Calculus 3 **4 QH**

Focuses on polar coordinates, vectors in a plane, calculus of functions of several variables, partial differentiation, multiple integrals, infinite series, vector analysis, and introduction to differential equations. (Not equivalent to MTH 1125.) *Prereq. MTH 1194 or MTH 4121; BSET majors only.*

MTH 1203 History of Mathematics **4 QH**

Focuses on development of the various branches of mathematics, lives of outstanding mathematicians, growth of mathematical knowledge and its relation to culture. (III)

MTH 1212 Linear Programming **4 QH**

Presents an introduction to concepts and techniques of linear programming, game theory, discrete modeling (shortest path, minimum spanning tree). Explores application to economics, social sciences, and other related fields. (II) *Prereq. One year of college mathematics.*

MTH 1223 Calculus for Engineering Majors 4 **4 QH**

Covers partial derivatives and multiple integrals, with applications. *Prereq. MTH 1125.*

MTH 1225 Differential Equations (Engineering) 1 **4 QH**

Offers a study of ordinary differential equations for engineering students. *Prereq. MTH 1223 or equiv.*

MTH 1226 Differential Equations (Engineering) 2 **4 QH**

Focuses on numerical methods for solving ordinary differential equations, Fourier series, and selected partial differential equations by separation of variables. Intended primarily for engineering students. *Prereq. MTH 1225.*

MTH 1230 Linear Algebra for Engineers **4 QH**

Introduces matrices through Gaussian elimination. Proceeds to vector spaces and linear equations; orthogonality; eigenvalues and eigenvectors. Emphasizes engineering applications such as systems of ordinary differential equations. *Prereq. MTH 1225.*

MTH 1237 Discrete Mathematics 2 **4 QH**

Covers elementary number and group theory. Examines fields, finite fields, coding theory, Hamming and BCH codes, counting arguments. *Prereq. MTH 1137 and MTH 1223.*

MTH 1238 Combinatorial Mathematics **4 QH**

Provides a transition from calculus to more traditional mathematics courses. Explores various techniques for counting, such as permutations, combinations, inclusion-exclusion, Polya enumeration, and the mathematical formulations necessary for these techniques, including elementary group theory and equivalence relations. *Prereq. Two courses in calculus.*

MTH 1243 Calculus for Science Majors 4 **4 QH**

Focuses on methods of calculus and vector analysis to study curves, surfaces, and functions of several variables. Studies parameterization of lines and planes, tangents and normal vectors, partial derivatives, maxima and minima problems, linear approximations, and tangent planes. Some linear algebra. *Prereq. MTH 1142.*

MTH 1244 Calculus for Science Majors 5 **4 QH**

Continues MTH 1243. Covers multiple integration, line integrals, and exact differentials; various forms of Stoke's theorem; and more linear algebra. *Prereq. MTH 1243.*

MTH 1245 Differential Equations (Science) 1 **4 QH**

Focuses on ordinary differential equations and linear algebra. Examines first-order equations, higher-order (primarily second-order) linear differential equations, systems of linear differential equations. Studies linear algebra, which includes eigenvalues and eigenvectors primarily for two-dimensional systems. Discusses applications of ordinary differential equations. *Prereq. MTH 1142.*

MTH 1246 Differential Equations (Science) 2 **4 QH**

Focuses on analysis of linear partial differential equations (wave equations, heat equation, and potential equation). Covers

ordinary differential equations with boundary values, Fourier analysis, and orthogonal functions. Also considers numerical methods and other topics in ordinary differential equations.

Prereq. MTH 1245.

MTH 1301 Linear Algebra 1 4 QH

Focuses on vectors and vector spaces, including function spaces, subspaces. Examines lengths, angles, scalar products; volumes, determinants; linear independence and dependence, dimension, linear and affine maps, kernel and image. Studies algorithms: row operations, double triangular form, inversion. Introduces linear maps. Gives particular attention to characteristic polynomials, eigenvalues, and eigenvectors in low dimensions. *Prereq.*

MTH 1244 or equiv.

MTH 1302 Linear Algebra 2 4 QH

Focuses on detailed study of linear maps. Studies symmetric maps and quadratic forms, isometries, skew-symmetric maps; decomposition of general linear maps using symmetric maps and isometries. Covers polynomials evaluated on linear maps, generalized eigenspaces, Jordan form. As time permits, introduces computational methods, with emphasis both on geometry underlying algorithms and on practical advantages and limitations. Surveys related areas in mathematics in which linear ideas play a role. *Prereq.* MTH 1301.

MTH 1311 Analysis 1 4 QH

Examines the theoretical foundations of calculus: limits, measure, continuity, and related concepts. With MTH 1312 serves as a bridge between the MTH 1243 through MTH 1246 calculus sequence and the more advanced analysis courses, such as MTH 1347, MTH 1348, MTH 1351, MTH 1370, and MTH 1371. *Prereq.* MTH 1246 or permission of instructor.

MTH 1312 Analysis 2 4 QH

Continues MTH 1311. Focuses on calculus, applying the concepts introduced in MTH 1311. *Prereq.* MTH 1311.

MTH 1321 Introduction to Groups and Their Applications 4 QH

Presents examples of groups (symmetry groups, permutation groups, matrix groups, cyclic groups) and their subgroups. Studies finite groups and orders of subgroups; homomorphisms and normal subgroups. Also considers applications to some of the following, depending on time and interest: geometry, number theory, crystallography, physics, and combinatorics.

MTH 1322 Topics in Rings, Fields, and Number Theory 4 QH

Focuses on algebraic properties of the integers and rational, real, and complex numbers. Also covers commutative rings, ideals, integral domains, and other quotient fields; polynomial rings; quadratic extension fields; Gaussian integers; and other topics as time permits. *Prereq.* MTH 1321.

MTH 1330 Number Theory 4 QH

Introduces the elementary methods of analytic number theory. Focuses on divisibility, congruences, arithmetical and multiplicative functions, quadratic reciprocity, and equivalent formulations of the prime number theorem. *Prereq.* MTH 1301 or permission of instructor.

MTH 1337 Foundations of Mathematics 1 4 QH

Studies the following topics and the shifts in perspective that their development brought about: disputes over the basis for calculus, twentieth-century discoveries in mathematical logic, and the advent of the computer. (V)

MTH 1338 Foundations of Mathematics 2 4 QH

Includes set theory, rules for set formation, the axiom of choice and its role in mathematics, transfinite cardinal and ordinal numbers and arithmetic, and axiomatizations of set theory.

MTH 1347 Applied Analysis 4 QH

Demonstrates the application of mathematics to interesting physical and biological problems. Examines methods chosen from ordinary and partial differential equations, calculus of variations, Laplace transforms, singular perturbations, special functions, dimensional analysis, and other techniques of applied mathematics. *Prereq.* MTH 1246 or permission of instructor.

MTH 1349 Numerical Analysis 1 4 QH

In practice, computations are never exact. Therefore, the problem of finding efficient methods to calculate sufficiently accurate answers is of fundamental importance. The emphasis of the course is not on recipes for solving problems, proving theorems, or on writing computer programs. Rather, the practical concerns of efficiency and accuracy are illustrated by studying the following problems: roots of a nonlinear equation, simultaneous linear equations, interpolation, and curve-fitting. *Prereq.* Two years of calculus and one course in programming.

MTH 1350 Discrete Algorithms in Analysis 4 QH

Analyzes problems in differential equations, integration, and ordinary differential equations. (Does not require prior knowledge of differential equations; MTH 1349 is not a prerequisite.) Emphasis is similar to that of MTH 1349. *Prereq.* Two years of calculus and one course in programming.

MTH 1351 Functions of a Complex Variable 1 4 QH

Focuses on algebra and geometry of complex numbers; concepts of limit, continuity, and derivative in the complex domain; holomorphic functions, series, contour integration; and applications. *Prereq.* MTH 1243 or equiv.

MTH 1352 Functions of a Complex Variable 2 4 QH

Continues MTH 1351. May include conformal mapping, analytic continuation, Riemann surfaces, the Laplace transform and inverse transform, elliptic functions, and applications. *Prereq.* MTH 1351.

MTH 1367 Geometry 4 QH

Studies classical Euclidean geometry and symmetry groups of geometric figures by an analytic approach. Teaches how to formulate mathematical propositions precisely and how to construct and understand mathematical proofs. Provides a line between classical and modern geometry with the aim of preparing students for further study in group theory and differential geometry. *Prereq.* Basic linear algebra or permission of instructor.

MTH 1370 Recent Ideas in Geometry 4 QH

Presents some non-Euclidean geometry, especially hyperbolic and elliptic geometries. Topics include algebraic curves and surfaces. *Prereq.* MTH 1367 or permission of instructor.

MTH 1384 Probability for Engineering 4 QH

Discusses sample spaces; axioms of probability; random variables and their distributions; expectation, moments, and characteristic function; bivariate distributions; jointly Gaussian random variables; stochastic processes, including autocorrelation function and power spectral density; and estimation of the mean and autocorrelation function in the presence of noise. *Prereq.* MTH 1223 and MTH 1225 or equiv.

MTH 1387 Probability 1**4 QH**

Focuses on probability functions for finite and infinite spaces; conditional probability and independence; discrete and continuous probability distributions for one or more random variables; expectation; moments; binomial, Poisson, and normal distributions; and central limit theorem. *Prereq.* MTH 1223 or MTH 1244.

MTH 1388 Probability 2**4 QH**

Studies selected topics, including introduction to stochastic processes, with emphasis on Poisson processes and Markov chains. *Prereq.* MTH 1384 or MTH 1387.

MTH 1390 Mathematical Statistics**4 QH**

Focuses on estimation of parameters, confidence intervals, hypothesis testing, regression, sampling distributions. Introduces analysis of variance and statistical decision theory. *Prereq.* MTH 1384 or MTH 1387.

**MTH 1714, MTH 1723, MTH 1724, MTH 1725, MTH 1726,
MTH 1733, MTH 1734, MTH 1735, MTH 1740, MTH 1741,
MTH 1742, Honors Program**

4 QH each

Special sections for honors students of courses MTH 1114, MTH 1123, MTH 1124, MTH 1125, MTH 1223, MTH 1133, MTH 1134, MTH 1135, MTH 1140, MTH 1141, and MTH 1142 respectively.

MTH 1763 Introduction to Computers (Honors)**4 QH**

Honors equivalent of MTH 1163.

**MTH 1801, MTH 1802, MTH 1803, MTH 1804, MTH 1805,
MTH 1806, MTH 1807, MTH 1808 Directed Study**

4 QH

Gives highly motivated students the opportunity to explore mathematical situations and theories in depth. Can be used as an opportunity to examine familiar material in fresh ways or to explore new material not offered in formal courses. Provides students strong in mathematics and the related sciences a chance to develop the art and skill needed to work independently and creatively in mathematics. *Prereq.* Permission of instructor. *Students strong in mathematics are permitted to enroll in graduate mathematics courses.*

MTH 1809 Directed Study: Problem Solving**4 QH**

Emphasizes mathematical problem-solving techniques from a range of areas, including but not limited to integration, differentiation, number theory, group theory, field theory, combinatorics, linear algebra, differential equations, and mathematical modeling. The mathematical model aspect constitutes one third to one half of the course. Analyzes specific realworld models in complete detail, including running and analyzing computer simulations. Requires students to make a number of presentations to the class demonstrating specific techniques. *Prereq.* Permission of instructor.

MTH 1810 Directed Study**1 QH**

Same description as MTH 1801 to MTH 1808. Offered for less intensive projects. *Prereq.* Permission of instructor.

MTH 1811 Directed Study**2 QH**

Same description as MTH 1801 to MTH 1808. Offered for less intensive projects. *Prereq.* Permission of instructor.

MTH 1825, MTH 1826, MTH 1827, MTH 1828**Junior/Senior Honors Project****4 QH each**

For details contact the honors office.

Modern Languages

Prerequisites listed for modern languages are based on current course numbers at Northeastern. If approved by the Department of Modern Languages and the dean's office, equivalent course work acquired elsewhere may be considered acceptable to satisfy these prerequisites. The following courses are offered in English, and no knowledge of a foreign language is required to take them: LNF 1510, LNF 1511, LNF 1512, LNF 1513, LNI 1510, LNI 1511, LNI 1512, LNR 1500, LNR 1510, LNR 1511, LNS 1500, LNS 1501, and LNS 1510. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

Cinema

The following cinema courses are offered by the Department of Modern Languages. For more information on the cinema studies minor and a listing of all cinema studies courses see page 32. These courses are conducted in English and no knowledge of a foreign language is required to take them. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

LNF 1550 Introductory Film Analysis**LNF 1551 Film Theory****LNF 1560 Film and Psychoanalysis****LNG 1554 Modern German Film and Literature****LNS 1550 Spanish Civil War in Spanish Film****Linguistics**

The following linguistics courses are offered by the Department of Modern Languages. For more information on the linguistics major or minor and a listing of all linguistics courses see page 51. These courses are conducted in English and no knowledge of a foreign language is required to take them. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

LNF 1250 History of the French Language**LNL 1235 Applied Linguistics****LNL 1260 Introduction to Romance Linguistics****LNS 1250 History of the Spanish Language****Literature and Culture (taught in English)**

The following courses are conducted in English and no knowledge of a foreign language is required to take them. Locate these courses under the appropriate heading for course descriptions. Language majors interested in obtaining major credit for any of these courses should consult their instructor.

LNF 1510 Modern Philosophical French Literature in Translation**LNF 1511 The Theme of Solitude in French Literature****LNF 1512 Masterpieces of Modern European Fiction****LNF 1513 French Seminar: Voltaire and Rousseau****LNI 1510 The Works of Dante in Translation 1****LNI 1511 The Works of Dante in Translation 2****LNI 1512 Italian Seminar: Pirandello**

- LNR 1500** Backgrounds in Russian Culture
LNR 1510 The Works of Alexander Pushkin in Translation
LNR 1511 Russian Literature in Translation
LNS 1500 Backgrounds in Hispanic Culture
LNS 1501 Backgrounds of Latin American Culture
LNS 1506 Cervantes and His Times
LNS 1510 Saints and Sinners: The Vision of Women in the Middle Ages and the Renaissance
LNS 1511 Introduction to Caribbean Literature
LNS 1512 The Don Juan Figure in Literature

Chinese

- LNC 1101 Elementary Chinese 1** 4 QH
 Designed to acquaint the student with features of spoken and written “Mandarin” Chinese. Stresses grammar, oral performance, and simple characters. Students who wish to speak another dialect of Chinese should consult instructor for proper placement.
- LNC 1102 Elementary Chinese 2** 4 QH
 Continues LNC 1101. Studies grammar and spoken and written forms of the language. *Prereq.* LNC 1101.
- LNC 1103 Intermediate Chinese 1** 4 QH
 Continues LNC 1102. Covers more advanced features of the language as well as continued study of characters. *Prereq.* LNC 1102.
- LNC 1104 Intermediate Chinese 2** 4 QH
 Continues LNC 1103. Offers more advanced work in grammar, conversation, and characters. *Prereq.* LNC 1103.
- LNC 1801 Directed Study in Chinese** 4 QH

French

- LNF 1101 Elementary French 1** 4 QH
 Designed for students with very little or no prior knowledge of French, this course provides a lively introduction to basic oral expression, listening comprehension, and elementary reading and writing. The audiolingual approach, using practical vocabulary drawn from realistic situations, aims at good pronunciation and ease in response. Each lesson incorporates helpful information about daily life in France and the varied cultures within the world of French speakers. Laboratory practice complements classwork, enables students to work aloud at their own speed, reinforces their acquisition of essential structures, and acquaints them with a vast library of audiovisual resources.
- LNF 1102 Elementary French 2** 4 QH
 Continues beginners’ exposure to the “four skills”—oral comprehension, speaking, reading, and writing French—so that the linguistic tools needed to understand and function in foreign contexts—at home, abroad, and in the world of literature and film—may be acquired. *Prereq.* LNF 1101.
- LNF 1103 Intermediate French 1** 4 QH
 Designed for students who wish to further their audiolingual skills and improve their reading and writing; combines a review and continued study of grammar essentials with oral, writing, and language lab practice. Varied readings include journalistic, cultural, and modern literary texts. Conducted primarily in French so that students may exercise their new skills. *Prereq.* LNF 1102 or *equiv.*

- LNF 1104 Intermediate French 2** 4 QH
 Uses the fundamentals of French to promote effective self-expression through speaking and writing and to explore the idiomatic aspects of the language. Through progressive class discussions and oral and written commentaries, students analyze a contemporary French novel or a French cultural reader, screenplay, or collection of short stories. The course strives, first, to help students read and comprehend modern French writing with confidence, and to be able to talk and write about it in good French; and second, to provide preparation for advanced courses. *Prereq.* LNF 1103.

- LNF 1107 Reading French in the Arts and Sciences** 4 QH
 Designed for students who wish to develop their reading skills, without regard to other aspects of the language such as speaking and writing. Stresses the grammar necessary for reading, together with vocabulary building. Uses scientific and nonscientific texts. May help graduate and undergraduate students who need to pass a reading examination to fulfill specific degree requirements. Not a substitute for LNF 1103 or LNF 1104. *Prereq.* LNF 1102 or *equiv.*
- LNF 1111 Elementary French for Business** 4 QH
 Similar to LNF 1101, but has added features relevant to business students, such as specialized vocabulary related to the business world and an immediate introduction to French business texts. LNF 1102 can be taken as a sequel to LNF 1111.

- LNF 1201 Intensive Review of French** 4 QH
 Reviews the principal structures of French in order to equip students with the knowledge that they will need to participate in advanced courses. Stresses vocabulary expansion, grammar review and drills, and reading and speaking skills. Required of all French majors, it serves as prerequisite for LNF 1202. Non-majors are invited as well, as this course is an excellent way to review previous French study.

- LNF 1202 French Composition and Conversation 2** 4 QH
 Continues LNF 1201, with emphasis on individual work, oral presentations, discussions, related grammar, and analysis of readings. Conducted in French. *Prereq.* LNF 1201 or *equiv.*

- LNF 1203 French Composition and Conversation 3** 4 QH
 Emphasizes further vocabulary building and mastery of fine points of grammar through written composition, prepared oral reports, and reading and discussion of articles from current periodicals. Gives special attention to the latest trends in spoken French, the study of idioms and proverbs, as well as selected examples of “argot” (slang). *Prereq.* LNF 1201 and LNF 1202 or *equiv.*

- LNF 1204 French Composition and Conversation 4** 4 QH
 Continues LNF 1203. Each student is expected to pursue one major project throughout the course, to be completed at the end of the quarter—such as planning and writing an original French magazine with one article to be submitted each week of the term. *Prereq.* LNF 1201 and LNF 1202 or *equiv.*

- LNF 1225 Introduction to the French-Speaking World** 4 QH
 Offers a cultural introduction to the French-speaking world through the study of various reading selections in the textbook *Le Monde Français*. Stresses vocabulary building and proper usage of a wide variety of grammatical forms; also examines the traditional backgrounds and aspects, as well as the contemporary and “pop” aspects, of the cultural heritage of the world’s French

speakers. Focuses mainly, but not exclusively, on France. *Prereq.* LNF 1104 or *equiv.*

LNF 1231 Masterpieces of French Literature 1 4 QH

Provides an introduction to French poetry, theatre (both comedy and tragedy), novels, and autobiographies through the study of key works from the Middle Ages and Renaissance through the Age of Enlightenment. Includes such writers as Villon, Molière, Racine, Voltaire, and Rousseau. Conducted largely in French. Designed to foster a critical approach to reading, improve reading, speaking, and writing skills; and help students apply these new skills to a greater understanding and appreciation of major French contributions to Western culture. Encourages group discussions in an effort to bring out the relation between the texts and contemporary issues. (II) *Prereq.* LNF 1104 or *equiv.*

LNF 1232 Masterpieces of French Literature 2 4 QH

Continues LNF 1231, which is not necessarily a prerequisite. Presents some of the most interesting and significant works of literature from the Romantic Age to the present. Readings include an "existential" play by Musset, poetry by Baudelaire and Verlaine, and fiction by Flaubert, Camus, and Robbe-Grillet. For a description of methodology, see LNF 1231. (II) *Prereq.* LNF 1104 or *equiv.*

LNF 1250 History of the French Language 4 QH

Examines the development and emergence of the French language from its earliest literary manifestations. Offers the opportunity to become familiar with the language's earlier stages. Emphasizes developing a working knowledge of medieval French. Includes the relationship of Old French to Latin, structural characteristics of Old French, and the impact of historical events on language. Compares different stages of French. Conducted in English. *Prereq.* Reading knowledge of French or permission of instructor.

LNF 1309 French Literature of the Nineteenth Century 1 4 QH

Treats romanticism as a major cultural phenomenon affecting each person's view of the world and the way he/she expresses experience. Examines romanticism in poetry and drama, as well as its continuation into the realist novel. Readings include Victor Hugo in poetry and the drama and Honoré de Balzac in the novel, as well as selections from other writers who represent aspects of romanticism and realism. Conducted principally in French. Offered every other year. *Prereq.* LNF 1232 or *equiv.*

LNF 1310 French Literature of the Nineteenth Century 2 4 QH

Explores the reaction against romanticism: aestheticism and personal modes of expression in contrast to the enthusiasm of the early romantics. Readings include a novel by Gustave Flaubert and the verse of Charles Baudelaire in *Les Fleurs du Mal*, as well as the poets who followed in his footsteps. Considers Flaubert and Baudelaire as precursors of modern literature. Conducted principally in French. Offered every other year. *Prereq.* LNF 1232 or *equiv.*

LNF 1311 French Literature of the Twentieth Century 1 4 QH

Offers a study of the major movements in the narrative and dramatic prose writers prior to World War II, including Alain-Fournier, Proust, Claudel, Gide, Mauriac, and Saint Exupéry. Requirements include reading a work from each author, discussing it in class, and presenting oral and written reports. Conducted in French, but English may be used. Offered in alternate years. *Prereq.* LNF 1232 or *equiv.*

LNF 1315 French Poetry, Past and Present 4 QH

Provides students with a survey of French poetry through the ages, focusing on representative works of the major French poets. Studies poems in their literary and historical context, with an examination of various aspects of French versification. Conducted in French.

LNF 1510 Modern Philosophical French Literature in Translation 4 QH

Studies the works of Camus and Sartre, who are considered the spokesmen for their generation's philosophical concerns. Develops a working knowledge of existentialism. Conducted in English.

LNF 1511 The Theme of Solitude in French Literature 4 QH

Traces the multiple facets of the theme of solitude from the beginnings of French literature to the present. Viewed as a source of both wonder and anguish, solitude is studied in its various manifestations, including banishment, imprisonment, expatriation, and seclusion. Examines the phenomena of moral and spiritual solitude as well. Authors studied include Charles d'Orleans, Du Bellay, Rousseau, Chateaubriand, Hugo, Verlaine, Mauriac, and Camus. Conducted in English. Texts read in English translation (those who wish to do so may read them in French).

LNF 1512 Masterpieces of Modern European Fiction 4 QH

Uses major representative works of fiction from the modern European tradition to introduce students to an array of theoretical and critical perspectives (cognitivism, marxism, formalism, and identity politics). Major authors include Dostoevsky, Mann, Kafka, Camus, Duras, and Achebe. Team taught in English by members of the modern language department.

Serves as an introduction to literature for language majors, who can get credit in their field of concentration by reading some of the works in the original language.

LNF 1513 French Seminar: Voltaire and Rousseau 4 QH

Offers an opportunity to study and compare the two great figures of the eighteenth century. Analyzes how, by their contrasting interests, personalities, and views of society, these writers contributed to fundamental changes in the political, philosophical, and literary world of their time—and ours. Includes class discussion, oral and written reports. Conducted in English.

LNF 1521 French Film Masterpieces 4 QH

Provides an introduction to some of the qualities that have made French film one of the great national cinemas. Focuses on both form and content; relates outstanding directors' major works to the French culture and society of their period. Taught in English; may be taken for French credit if assignments are completed in French. (IV)

LNF 1550 Introductory Film Analysis 4 QH

Aims to cultivate critical skills in analyzing the film medium, enabling students to articulate ways in which film shapes their experience. Focuses on form, the way in which the parts of a film are related to one another to create a whole, and style, including mise-en-scène, cinematography, editing, and sound. Studies style in relation to audience expectations and the constitutive role of film form. Organized around weekly film screenings and individual study of films put on reserve in the Media Center of Snell Library.

LNF 1551 Film Theory 4 QH

Investigates the fundamental issues surrounding the nature and possibilities of film art. Introduces a variety of theoretical

approaches, including semiotics, auteur theory, psychoanalysis, and feminism. Weekly screenings focus on two or three topics: a film author (such as Buñuel, Truffaut, or Welles), a well-defined film movement (such as neorealism, the New German cinema, or the French New Wave), or films about film-making practice. Coursework includes reading articles and writing a research paper using the resources (including film journals) of the Media Center of Snell Library. (V)

LNF 1560 Film and Psychoanalysis 4 QH

Explores the nature and possibilities of the psychoanalytic interpretation of film, demonstrating that such an approach offers an additional dimension to the analysis of a work of art. Focuses on elements in the work that are derivative of unconscious processes, especially fantasies, dreams, symbolism, and imagery. Discusses material in the works studied that relates to neurotic conflicts, character structure and formation, interpersonal relationships, and distortions in psychological development. Weekly film screenings will be accompanied by lectures and discussions; each student will select one film (placed on reserve in the Media Center of Snell Library) for individual study on a topic of his/her choice.

LNF 1801, LNF 1802, LNF 1803, LNF 1804, LNF 1805 Directed Study 4 QH each

Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Will not be given in areas adequately covered by existing courses. Priority given to language majors and to juniors and seniors.

LNF 1820, LNF 1821, LNF 1822, LNF 1823 4 QH each
Junior/Senior Honors Project

For details contact the honors office.

German

LNG 1101 Elementary German I 4 QH

Examines basic grammatical structure of German through practice in listening comprehension, speaking, reading, and writing. Includes classroom and language lab instruction. No previous study of German necessary. (Special sections of this course are run for business students.)

LNG 1102 Elementary German 2 4 QH

Continues LNG 1101. Emphasizes knowledge of the basic grammatical structure of German and flexibility in the four language skills. (Special sections of this course are run for business students.) *Prereq.* LNG 1101 or equiv.

LNG 1103 Intermediate German I 4 QH

Offers a comprehensive review and reinforcement of the major aspects of German grammar and usage; continues to explore the four major skills of listening comprehension, speaking, reading, and writing; introduces the student to the reading of contemporary literary texts, including a full-length play—*Biedermann und die Brandstifter*, by the Swiss playwright Max Frisch. *Prereq.* LNG 1102 or equiv.

LNG 1104 Intermediate German 2 4 QH

Offers an opportunity to increase vocabulary as well as flexibility in the four basic language skills. Topics include grammar review, continued exposure to modern literary texts. One full-length play is read—*Der Besuch der alten Dame*, by the contemporary Swiss

dramatist Friedrich Dürrenmatt. Successful completion entitles the student to choose from among the upper-level course offerings in the areas of German literature and/or composition and conversation. *Prereq.* LNG 1103 or equiv.

LNG 1107 Reading German 4 QH

Offers an opportunity to develop reading skills, disregarding other aspects of the language, such as speaking or writing. Stresses grammar necessary for reading, together with vocabulary building; scientific and nonscientific texts are read. Provides assistance to students, graduate and undergraduate, who need to pass a reading examination to fulfill specific degree requirements.

LNG 1111 Business German I 4 QH

Provides an introduction to written German in business administration usage as found in general-purpose professional texts. Develops grammatical knowledge and competence in reading comprehension, translation, and phonetic accuracy. Considers the Federal Republic of Germany as an internationally leading economic power. Discusses weekly readings (in English) from trade publications on aspects of the German business world, including foreign and U.S. trade. Assumes no prior knowledge of German.

LNG 1201 German Composition and Conversation 1 4 QH

Strives to develop facility in speaking and writing German and stresses active use of the language. Provides an opportunity for practice in listening comprehension through German language films or tape-recorded interviews with native German speakers; expansion of vocabulary through guided group discussions on topics of general interest; and development of language skills in areas of individual interest through preparation of oral reports in German. Includes weekly composition assignments and grammar reviews as needed. Language lab. Recommended for students preparing for co-op in Germany. *Prereq.* LNG 1104 or equiv.

LNG 1202 German Composition and Conversation 2 4 QH

Continues German LNG 1201 in content and format with emphasis on independent communication skills. Recommended for students preparing for co-op in Germany. *Prereq.* LNG 1201 or equiv.

LNG 1231 Masterpieces of German Literature 1 4 QH

Surveys the major trends in the development of German literature from the Hildebrandslied to Martin Luther. Includes reading of selected works of major authors of the twentieth century such as Hauptmann, Kafka, Mann, Brecht, Dürrenmatt, and Böll. Works read in a particular term will be based partially on theatre performances or film showings planned in the Boston area. Class attendance of these performances is anticipated. Recommended as an introductory step to literature courses LNG 1307 and above. Offered every other year, alternating with LNG 1232. *Prereq.* LNG 1104 or equiv.

LNG 1232 Masterpieces of German Literature 2 4 QH

Studies short fiction from Goethe to the present. Includes Goethe's *Die Leiden des Jungen Werthers*, ETA Hoffman's stories of fantasy and madness, Thomas Mann's *Der Tod in Venedig*, and Franz Kafka's *Die Verwandlung*, as well as stories by Böll, Grass, Christa Wolff, and others. Complements readings and lectures in German with musical and screen adaptations of the works. Recommended as an introduction to literature courses LNG 1307 and above. May be taken before LNG 1231. *Prereq.* LNG 1104 or equiv.

LNG 1309 German Literature of the Nineteenth Century**4 QH**

Offers background and general survey of German literature of the nineteenth century, with particular attention to prose and lyric poetry. Includes poems of all the important romantic poets, beginning with Holderlin, Tieck, Novalis, and extending through Morike. Discusses Novellen by Eichendorff, Tieck, Chamisso, Kleist, Fougue, Keller, Meyer, and Ludwig. Lectures (in German) and reports. *Prereq.* LNG 1232 or equiv.

LNG 1311 German Literature of the Twentieth Century**4 QH**

Considers lyric poetry and prose works of important German writers of the twentieth century, including Schnitzler, Hauptmann, Mann, and Kafka. Lectures (in German) and reports. *Prereq.* LNG 1232 or equiv.

LNG 1554 Modern German Film and Literature**4 QH**

Introduces contemporary issues in German culture. Studies the importance of the Faust legend as a striving for *Unendlichkeit*—going beyond normal human limitations—as expressed in the classicism of Goethe and the expressionist movement in art and film. Explores the balancing of Weimar as compared to Nazi culture. Examines the multiple pressures and complex issues of the postwar era as outgrowths of these earlier periods. Considers major novels, stories, and poems by Boll, Grass, Mann, and Brecht as adapted by a generation of new German filmmakers— Fassbinder, Schlöndorff, Sanders-Brahms, and Wenders. Conducted in English; may be taken for German credit by special arrangement. (IV)

LNG 1801, LNG 1802, LNG 1803, LNG 1804, LNG 1805**4 QH each****Directed Study**

Directed studies offer students a way of going beyond work given in the regular curriculum and may also serve as a means to complete major or minor requirements in certain situations. Directed studies will not be given in areas adequately covered by existing courses. Priority is given to language majors and to juniors and seniors.

LNG 1820, LNG 1821, LNG 1822, LNG 1823**4 QH each****Junior/Senior Honors Project**

For details contact the honors office.

Italian**LNI 1101 Elementary Italian 1****4 QH**

For the beginner who wants instruction in the essentials of Italian grammar and the opportunity to practice speaking and reading the language.

LNI 1102 Elementary Italian 2**4 QH**

Continues study of grammar and basic language skills. Practices advanced conversation and reading. *Prereq.* LNI 1101 or equiv.

LNI 1103 Intermediate Italian 1**4 QH**

Reviews grammar. Offers progressively more intensive practice in oral and written communication. Selects readings from modern texts. *Prereq.* LNI 1102 or equiv.

LNI 1104 Intermediate Italian 2**4 QH**

Reviews grammatical difficulties, with attention given to current idiomatic forms. Greater emphasis on self-expression. Reading of short stories or a modern novel. *Prereq.* LNI 1103 or equiv.

LNI 1201 Italian Composition and Conversation 1**4 QH**

For students who have mastered the fundamentals of the language. There will be no study of grammar as such. The course

aims at helping students strengthen speaking and writing ability through an analysis of the language, oral and written reports, and general discussions on a variety of topics. Conducted entirely in Italian. *Prereq.* LNI 1104 or equiv.

LNI 1202 Italian Composition and Conversation 2**4 QH**

Continues LNI 1201. Stresses individual work, free discussions, and compositions. Conducted entirely in Italian. *Prereq.* LNI 1201 or equiv.

LNI 1311 Italian Literature of the Twentieth Century 1**4 QH**

Explores some of the novels, plays, and poems from a variety of literary trends and styles that evolved between the turn of the century and World War II. Studies authors such as Verga, Pascoli, D'Annunzio, Pirandello, Deledda, and Svevo. Oral and written reports. Conducted in Italian, but students may use English. Offered in alternate years. *Prereq.* LNI 1232 or equiv.

LNI 1312 Italian Literature of the Twentieth Century 2**4 QH**

Examines the postwar period to the present. Considers the many important authors since the early forties, and their books reflecting the preoccupations, moods, and aspirations of our changing times. Includes writers such as Moravia, Silone, Vittorini, Pavese, Guareschi, Buzzati, Sciascia, Ungaretti, Montale, and Quasimodo. Requires oral and written reports. Conducted in Italian, but students may use English. Offered in alternate years. *Prereq.* LNI 1232 or equiv.

LNI 1510 The Works of Dante in Translation 1**4 QH**

Considers briefly the cultural background and various literary schools that influenced Dante. His life, his character, and minor works are discussed. The *Vita Nuova* and the first cantica of the *Divina Commedia*, the "Inferno," are read and analyzed in some detail. This course is intended for students of any background or major. Bilingual texts are used so that students with a background in Italian and others, may refer to the original for added interest and enrichment. Conducted in English. (III)

LNI 1511 The Works of Dante in Translation 2**4 QH**

Continues LNI 1510, but may be taken separately. Studies in detail the other two parts of the *Divina Commedia*, "Purgatorio" and "Paradiso." Open to anyone. Bilingual texts used. Conducted in English.

LNI 1512 Italian Seminar: Pirandello**4 QH**

By viewing reality in the world and human personality with strikingly new insights, Pirandello contributed a new dimension to our understanding of human nature and brought about significant changes to the traditional conception of the theatre. This course examines the originality and art of Pirandello by a close study of some of his great plays and short stories. Classwork includes discussions and oral and written reports. Conducted in English.

LNI 1801, LNI 1802, LNI 1803, LNI 1804, LNI 1805 Directed Study**4 QH each**

Directed studies offer students a way of going beyond work given in the regular curriculum and may also serve as a means to complete major or minor requirements in certain situations. Directed studies will not be given in areas adequately covered by existing courses. Priority is given to language majors and to juniors and seniors.

LNI 1820, LNI 1821, LNI 1822, LNI 1823**4 QH each****Junior/Senior Honors Project**

For details contact the honors office.

Linguistics

LNL 1235 Applied Linguistics 4 QH
Explores how second and foreign languages are learned. Reviews second language acquisition theory and research. Discusses learner goals, strategies, and anxieties. Examines language teaching techniques and methodologies.

LNL 1260 Introduction to Romance Linguistics 4 QH
Provides a general linguistic introduction to one of the most important language families. Discusses the structural characteristics of several Romance languages. Includes defining a language family, how and why languages change, and the relationship of standard and nonstandard linguistic varieties. Studies contemporary theoretical issues in Romance linguistics including object pronoun placement, word order, creolization, and subject pronouns use. Conducted in English. *Prereq.* Reading knowledge of one Romance language or permission of instructor.

Russian

LNR 1101 Elementary Russian 1 4 QH
Explores the essentials of grammar, practice in pronunciation, progressive acquisition of a basic vocabulary, idiomatic expressions.

LNR 1102 Elementary Russian 2 4 QH
Continues grammar study; oral and written exercises. *Prereq.* LNR 1101.

LNR 1103 Intermediate Russian 1 4 QH
Offers further knowledge of Russian through oral and written work; the study of grammar, and reading texts of moderate difficulty. *Prereq.* LNR 1102.

LNR 1104 Intermediate Russian 2 4 QH
Continues LNR 1103. *Prereq.* LNR 1103.

LNR 1201 Russian Composition and Conversation 1 4 QH
Offers assistance in developing skills in speaking and writing by means of detailed grammar review and extensive use of audio-visual media. Conducted in Russian. *Prereq.* LNR 1104 or equiv.

LNR 1202 Russian Composition and Conversation 2 4 QH
Continues LNR 1201 with an increased emphasis on speaking the colloquial Russian idiom. Conducted in Russian. *Prereq.* LNR 1201 or equiv.

LNR 1205 Stylistics and Advanced Grammar Analysis 1 4 QH
Designed for students pursuing a major or minor in the Russian language; focuses on modern usage of the Russian language through newspaper and magazine articles and short stories. *Prereq.* LNR 1104 or permission of instructor.

LNR 1309 Russian Short Stories of the Nineteenth Century 4 QH
Offers detailed analysis of selected representative short stories read in Russian; study of the development of this genre. *Prereq.* LNR 1104 or equiv.

LNR 1315 Russian Expository Prose 4 QH
Analyzes lectures, speeches, essays, and critical studies by outstanding Russian scholars. *Prereq.* LNR 1104.

LNR 1316 Russian Folklore 4 QH
Explores various genres of Russian folk literature in Russian. Readings are supplemented with lectures and tape recordings. *Prereq.* LNR 1104.

LNR 1500 Backgrounds in Russian Culture 4 QH
Designed to offer the student a view of Russian culture and civilization; includes guest speakers, films, field trips, and discussions. Conducted in English.

LNR 1510 The Works of Alexander Pushkin in Translation 4 QH
Offers a survey and analysis in English of Pushkin's artistic prose, lyric poetry, correspondence, friendships, and major literary influences.

LNR 1511 Russian Literature in Translation 4 QH
A companion to LNR 1510; provides a survey and analysis in English of some of the works of Tolstoi, Dostoevski, Chekhov, and others.

LNR 1801, LNR 1802, LNR 1803, LNR 1804, LNR 1805 4 QH each
Directed Study
Directed studies offer students a way of going beyond work given in the regular curriculum and may also serve as a means to complete major or minor requirements in certain situations. Directed studies will not be given in areas adequately covered by existing courses. Priority is given to language majors and to juniors and seniors.

LNR 1820, LNR 1821, LNR 1822, LNR 1823 4 QH each
Junior/Senior Honors Project
For details contact the honors office.

Spanish

LNS 1101 Elementary Spanish 1 4 QH
Presents essentials of correct usage through acquisition of basic skills in reading, writing, speaking, and aural comprehension.

LNS 1102 Elementary Spanish 2 4 QH
Continues language instruction with increasing attention to vocabulary and skills relevant to persons who wish to become involved with the Hispanic world. *Prereq.* LNS 1101 or equiv.

LNS 1103 Intermediate Spanish 1 4 QH
Includes completion of basic grammatical usage; reading of contemporary Hispanic plays; and oral and written communication based upon assigned readings. *Prereq.* LNS 1102 or equiv.

LNS 1104 Intermediate Spanish 2 4 QH
Offers intensive reading of current topics, conversation practice utilizing skills acquired in previous coursework, and composition practice based upon varied assigned topics. *Prereq.* LNS 1103 or equiv.

LNS 1105 Conversational Spanish 1 4 QH
Emphasizes developing the ability to speak and comprehend Spanish. Particularly able students may be accepted after having completed only LNS 1103. In this case, LNS 1105 may be used to satisfy the language requirement. *Prereq.* LNS 1104 or equiv.; open to nonmajors only.

LNS 1106 Conversational Spanish 2 4 QH
Continues LNS 1105, with further emphasis on the development of oral facility in Spanish. Particularly able students may be

accepted after having completed only LNS 1104. *Prereq.* LNS 1105 or *equiv.*; open to nonmajors only.

LNS 1130 Intensive Spanish 8 QH

This course encompasses the same material covered in LNS 1101 and LNS 1102. Students with language-learning ability and a commitment to the study of foreign languages are encouraged to take the course. Students are expected to assimilate the material at an accelerated pace. This is a two-sequence course; students must enroll in both sequences. Satisfactory completion of this course enables the student to take LNS 1103.

LNS 1201 Spanish Composition and Conversation 1 4 QH

Offers practice in writing and speaking Spanish, including written and oral resumes, prepared speeches and themes, and impromptu speaking and writing. Reviews the more subtle problems of grammar.

LNS 1202 Spanish Composition and Conversation 2 4 QH

Offers further practice in oral and written Spanish; continues study of advanced Spanish grammar. *Prereq.* LNS 1201 or *equiv.*

LNS 1203 Advanced Spanish Proficiency 1 4 QH

Designed for those preparing to enter the teaching profession as well as qualified advanced students. Covers advanced elements of Spanish syntax, with emphasis upon achieving superior speaking, reading, and writing skills. *Prereq.* Permission of instructor.

LNS 1204 Advanced Spanish Proficiency 2 4 QH

Continues the aims and goals of LNS 1203. *Prereq.* LNS 1203 and permission of instructor.

LNS 1231 Masterpieces of Spanish Literature 1 4 QH

Traces the development of Spanish literature from the Middle Ages (las jarchas, *El poema del Cid*, *El libro de buen amor*, *La Celestina*) through the Renaissance and Baroque periods or Golden Age (Garcilaso de la Vega, the picaresque novel, the mystics, Cervantes, Lope de Vega, Calderon). Conducted in Spanish. (II) *Prereq.* LNS 1104 or *equiv.*

LNS 1232 Masterpieces of Spanish Literature 2 4 QH

Continues LNS 1231. Surveys the literature of eighteenth-, nineteenth-, and twentieth-century Spain. Includes the literary movements of romanticism, realism, and the generation of '98. Conducted in Spanish. (II) *Prereq.* LNS 1104 or *equiv.*

LNS 1250 History of the Spanish Language 4 QH

Examines the development and emergence of the Spanish language. Offers the opportunity to become familiar with the language's earlier stages. Emphasizes developing a working knowledge of medieval Spanish. Includes the relationship of old Spanish to Latin, structural characteristics of Old Spanish, and the impact of historical events on language. Compares different stages of Spanish. Conducted in English; however, the textbook is in Spanish. *Prereq.* Reading knowledge of Spanish or permission of instructor.

LNS 1301 Spanish Medieval Literature 4 QH

Examines the origins of Spanish Literature from the tenth through the fourteenth centuries. Included among the texts for this class are excerpts from the *jarchas*; the *Poema de Mio Cid*; Berceo's saints' lives; the histories of Alfonso X; *El Conde Lucanor*; *El Libro de Buen Amor*. Also examines non-literary texts such as wills and laws for their historical and literary relevance.

LNS 1306 Spanish Golden Age Theatre 4 QH

Examines plays by the outstanding dramatists of the seventeenth century: Lope de Vega, Calderon de la Barca, Tirso de Molina, Ruiz de Alarcon, and others. Conducted in Spanish. *Prereq.* LNS 1232 or *equiv.*

LNS 1309 Spanish Literature of the Nineteenth Century 1 4 QH

Covers readings in the prose, poetry, and drama of the romantic period, including selections from el Duque de Rivas, Larra, Espronceda, Zorrilla, and Becquer. Conducted in Spanish. *Prereq.* LNS 1232 or *equiv.*

LNS 1310 Spanish Literature of the Nineteenth Century 2 4 QH

Offers a study of some of the major novelists of the second half of the nineteenth century, such as J. M. de Pereda, Juan Valera, Emilia Pardo Bazan, and B. Perez Galdos. Conducted in Spanish. *Prereq.* LNS 1232 or *equiv.*

LNS 1311 Spanish Literature of the Twentieth Century 1 4 QH

Examines selections from the writings of the Generation of '98: Unamuno, Valle-Inclan, Pio Baroja, Benavente, Azorin, and the Machado brothers. *Prereq.* LNS 1232 or *equiv.*

LNS 1312 Spanish Literature of the Twentieth Century 2 4 QH

Focuses on prose and poetry of modern writers, such as Ortega y Gasset, Perez de Ayala, Garcia Lorca, Juan Ramon Jimenez, Gironella, and Jose Cela. *Prereq.* LNS 1232 or *equiv.*

LNS 1315 Latin American Literature 1 4 QH

Focuses on Latin American literature from the colonial period to the nineteenth century. Students read a variety of short pieces from an anthology, followed by a full-length work. Authors read include Bernal Diaz, Sor Juana, Jorge Isaacs and José Hernández. *Prereq.* LNS 1204 or *equiv.*

LNS 1316 Latin American Literature 2 4 QH

Focuses on Latin American literature from the late nineteenth century to the contemporary period. Students read a variety of short pieces from an anthology, followed by a full-length work. Authors read include Martí, Borges, Castellanos and Vargas Llosa. *Prereq.* LNS 1204 or *equiv.*

LNS 1400 Spanish Seminar 4 QH

Focuses upon a narrowly defined theme (that is, a single author, a single work, or a single theme), which students are asked to explore in depth; students are expected to present a final paper based upon individual research. Designed primarily for majors who have progressed to the upper-level literature courses in Spanish. However, nonmajors who show exceptional background may be admitted with the instructor's permission.

LNS 1401 Seminar in Spanish Literature 4 QH

Focuses on a selected group of Galdos's novels thorough detailed discussion and analysis of the novels and collateral readings. An upper-level literature course designed primarily for majors; nonmajors who show exceptional background in Spanish may be admitted. *Prereq.* Permission of instructor.

LNS 1402 Seminar in the Contemporary Spanish Theatre 4 QH

Examines a number of dramatists committed to revealing the tragic social and existential aspects of the human condition in contrast to the bourgeois theatre of consumption in Spain. Emphasis is placed on authors such as Vallejo, Sartre, the members of the *generacion realista*, and the "underground"

playwrights. Conducted in Spanish. Class participation as well as oral and written projects required. Alternates yearly with LNS 1401. *Prereq.* LNS 1232 or permission of instructor.

LNS 1500 Backgrounds of Spanish Culture 4 QH

Examines chronologically the forces which have forged Spanish culture and have made Spain the nation it is today. Traces the development of Spain from the prehistoric caves of Altamira to the present. Observes past and present concerns such as divorce and abortion in a Catholic country, education, the role of women, linguistic diversity, separatism and terrorism, and the incorporation of Spain into the European Community. Incorporates history, sociology, anthropology, geography, economics, and politics. Conducted in English. (IV)

LNS 1501 Backgrounds of Latin American Culture 4 QH

Introduces students to Latin American culture through the study of a broad array of literary and critical writings by Latin American authors and selected films from Latin America. Authors read include Sor Juana, García Márquez, and Jorge Amado. Conducted in English. (IV)

LNS 1506 Cervantes and His Times 4 QH

Introduces students to *Don Quijote de la Mancha*, Cervantes' major work as well as Spain's greatest masterpiece and its supreme gift to Western culture. Studies Cervantes' minor works, *The Exemplary Novels* and *Intertudes*. Examines literary, sociological, philosophical, and historical matters: the development of the novel, genre and narratology, role playing and representation, Spain's triumphs and defeats. Deals with the Spanish Inquisition and censorship and themes such as madness, truth and lying, and appearance and reality. Conducted in English. (III)

LNS 1510 Saints and Sinners: The Vision of Women in the Middle Ages and the Renaissance 4 QH

Examines the attainment of and the atonement for love and society's changing attitude toward women as reflected in the literature of the times. Covers selected fabliaux, short stories, poems, and plays from Boccaccio, Chaucer, Ruiz, Rojas, Machiavelli, Lope de Vega, Calderon, Quevedo, Racine, Middleton, as well as women writers. Reference is made to historical and sociological materials. Conducted in English. All required readings are in translation.

LNS 1511 Introduction to Caribbean Literature 4 QH

Provides a comparative introduction to the modern literary traditions of the Spanish-, English-, and French-speaking Caribbean. Includes authors such as Carpentier (Cuba), Naipaul (Trinidad), Zobel (Martinique), and Cardenal (Nicaragua).

LNS 1512 The Don Juan Figure in Literature 4 QH

Examines the emergence and development of the Don Juan figure in Western literature. Analyzes the character of Don Juan, beginning with his first appearance in the theater of seventeenth-century Spain, and following his development well into the twentieth century. Strives to develop an appreciation and understanding of the character of Don Juan through the centuries, and to analyze the similarities and the differences that may be seen in the character from one cultural milieu to another. Conducted in English; non-English works read in translation. (III)

LNS 1550 Spanish Civil War in Spanish Film 4 QH

Introduces the Spanish film and provides an understanding of the Spanish Civil War (1936-1939). Uses a semiotic approach; studies

images of the Spanish Civil War in photographs and posters to show how fictional and historical texts are transferred to the screen. Examines both documentaries and award-winning feature films by prominent Spanish directors. Demonstrates how the realism of the Spanish cinema is combined with surrealist imagery and metaphor to create a distinctive visual style. (III)

LNS 1801, LNS 1802, LNS 1803, LNS 1804, LNS 1805 4 QH each
Directed Study

Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Will not be given in areas adequately covered by existing courses. Priority given to language majors and to juniors and seniors.

LNS 1820, LNS 1821, LNS 1822, LNS 1823 4 QH each
Junior/Senior Honors Project

For details contact the honors office.

Music

MUS 1100 Introduction to Music 4 QH

Offers an introduction to selected works of our Western musical heritage, from earliest to contemporary styles. Consists primarily of a survey and listening format, with emphasis on styles, basic theory, forms, and the historical, social, and artistic periods that these works represent. (II)

MUS 1101 Music as a Listening Experience 4 QH

Offers a computer-based "how to listen to classical music" course that assumes no previous musical knowledge. Studies masterworks of Western music but develops listening skills that are globally applicable. Students proceed at their own pace under the guidance and supervision of the instructor. All listening is done at a computer in the Media Center in room 200 Snell Library.

MUS 1103 Music as a Social Expression 4 QH

Examines the processes of music-making and the perceptions of music's functions in our culture. Considers how music is made, what music means, what kind of music is made, and what music is made to be meaningful. Identifies styles and genres of music and examines them within an ever-shifting context of aesthetics, social history, and cultural change. (III)

MUS 1104 Survey of African-American Musics 4 QH

Explores the various musical traditions of African-Americans, with a specific focus on the United States. Examines the impact of African, European, and Native American traditions on African-American music as well as the role of music as an expression of African-American aesthetics, traditions, and life. Considers historical and contemporary forms of African-American musics, with selected video presentations of musical styles. Same as AFR 1153.

MUS 1105 Music of the U.S.A. 4 QH

Examines American music from the time of Puritan psalm singing to the present. Covers a wide variety of music, including concert music, traditional folk music, jazz, and contemporary styles. (V)

MUS 1106 Women in Music 4 QH

Examines the multi-faceted role of women in music from the Renaissance through to the present. Discusses the fact that for centuries women have been active and influential patrons,

composers, teachers, conductors, and performers in Europe and America. Examines their contributions to classical and popular music and to jazz, with emphasis on such widely varying figures as Elizabeth Jacquet de la Guerre, Fanny Mendelssohn Hensel, Clara Schumann, Amy Beach, Germaine Tailleferre, Billie Holiday, Carla Bley, Ruth Crawford Seeger, Pauline Oliveros, Sarah Caldwell, Antonia Brico, and Nadia Boulanger.

MUS 1107 Principles of Music Literature 4 QH

Examines the evolution of each major structural element of music through a historical perspective. Also, attempts to link larger categories of music such as classical, popular, and non-Western by examining their common elements. Required of all music majors. *Prereq.* *Permission of instructor.*

MUS 1109 Introduction to Art, Drama, and Music 4 QH

Offers an interdisciplinary approach to music and other arts including painting, film, and theater. Examines works of art from various periods in the context of the cultures that produced them. Supplements regular classes with visits to art museums or attendance at concerts and theatrical performances. (II)

MUS 1110 Music in Popular Culture 4 QH

Deals with the nature of music composed for the mass market. Discusses techniques of recording and merchandising music and selected songs analyzes for their musical content. Traces the evolution of various styles, including ragtime, jazz, blues, rock, and music for the media.

MUS 1111 Rock Music 4 QH

Examines the development of rock'n'roll and its relationship to blues, rhythm and blues, country, folk, and other styles of music. Considers themes such as the role of rock as youth music, the reflections of social realities in rock songs, the relationship of rock to the recording industry and the mass media, and the changing styles of rock. Emphasizes listening skills.

MUS 1112 Jazz 4 QH

Examines the evolution of the creative improvisational musical styles commonly called jazz from its African-American roots to its status as one of America's classical musics and an internationally valued art form. Explores the contributions of African and European musical traditions and African-American spirituals, work songs, and blues. Examines major contributors and stylistic development and change through selected audio and audio-visual presentations. Also considers the socio-cultural dynamics that have affected musical evolution and acceptance.

MUS 1120 Topics in Music History 4 QH

Provides a chronological view of Western music, while examining the role of music in society and exploring the contributions of influential composers. Discusses representative works from each period, including music by composers such as Machaut, Josquin, Bach, Handel, Mozart, Haydn, Beethoven, Berlioz, Wagner, Mahler, and Stravinsky. (III) *Prereq.* *MUS 1201.*

MUS 1121 Medieval and Renaissance Music 4 QH

Offers an introduction to European music from the sixth through the sixteenth centuries. Covers a wide variety of music, ranging from the serene elegance of sacred Gregorian chant and the plaintive love songs of the medieval troubadours to the lively dances and humanistic vocal music of the Renaissance. Examines representative works by composers such as Machaut, Landini, Josquin, Palestrina, and Dowland.

MUS 1112 Jazz 4 QH

Examines the evolution of the creative improvisational musical styles commonly called jazz from its African-American roots to its status as one of America's classical musics and an internationally valued art form. Explores the contributions of African and European musical traditions and African-American spirituals, work songs, and blues. Examines major contributors and stylistic development and change through selected audio and audio-visual presentations. Also considers the socio-cultural dynamics that have affected musical evolution and acceptance.

MUS 1120 Topics in Music History 4 QH

Provides a chronological view of Western music, while examining the role of music in society and exploring the contributions of influential composers. Discusses representative works from each period, including music by composers such as Machaut, Josquin, Bach, Handel, Mozart, Haydn, Beethoven, Berlioz, Wagner, Mahler, and Stravinsky. (III) *Prereq.* *MUS 1201.*

MUS 1121 Medieval and Renaissance Music 4 QH

Offers an introduction to European music from the sixth through the sixteenth centuries. Covers a wide variety of music, ranging from the serene elegance of sacred Gregorian chant and the plaintive love songs of the medieval troubadours to the lively dances and humanistic vocal music of the Renaissance. Examines representative works by composers such as Machaut, Landini, Josquin, Palestrina, and Dowland.

MUS 1122 Music of the Baroque Era 4 QH

Focuses on music of the seventeenth and early eighteenth centuries in Italy, Germany, France, and England. Discusses the emergence of important new genres (such as opera, sonata, and concerto) and examines representative works of major composers (such as Bach, Handel, Corelli, Vivaldi, Rameau, and Purcell).

MUS 1123 Music of the Classical Era 4 QH

Focuses on crucial developments in musical styles and forms of the late eighteenth century and on emerging genres, such as the symphony, the concerto, and the string quartet. Emphasizes the vocal and instrumental works of Haydn and Mozart and the early works of Beethoven

MUS 1124 Music of the Romantic Era 4 QH

Focuses on romantic realism and idealism as expressed in the music of the nineteenth century. Emphasizes historical, nationalistic, and literary influences. Includes composers such as Beethoven, Schumann, Schubert, Berlioz, Liszt, Verdi, Wagner, Brahms, Tchaikovsky, and Mahler. (V)

MUS 1125 Twentieth-Century Music 4 QH

Focuses on developments in music from 1900 to the present. Examines a broad range of musical styles, including expressionism, neo-classicism, and other major trends in music of the twentieth century. (V)

MUS 1126 New Directions in Music 4 QH

Recognizes that music from 1950 to the present has changed more radically than during any other era in history. Examines new elements in classical and popular music and focuses on the relationship between the two styles.

- MUS 1130 The Symphony** 4 QH
Studies the symphony as a major genre in the classical, romantic, and contemporary periods. Includes works by composers such as Haydn, Mozart, Beethoven, Schumann, Tchaikovsky, Brahms, Sibelius, and Prokofiev.
- MUS 1131 Piano Music: The Great Composers and Performers** 4 QH
Gives students the opportunity to hear and analyze some of the greatest works for piano, performed by some of the world's greatest performers. In addition to recordings by internationally acclaimed artists, presents live performances by guest artists from the Boston area.
- MUS 1132 Introduction to Opera** 4 QH
Offers an analysis of opera as a dramatic genre. Isolates and discusses aria, recitative, ensemble, and other basic elements of opera. Considers number opera, music drama, and Singspiel types of opera. Includes composers such as Mozart, Wagner, Verdi, and Puccini.
- MUS 1133 Great Choral Literature** 4 QH
Analyzes sacred and secular choral literature from medieval to contemporary times.
- MUS 1134 Music and Poetry** 4 QH
Examines the art of setting words to music. Confronts the aesthetic problems encountered in a synthesis of two different art forms. Examines that synthesis in selected songs, choral works, tone poems, and operas of diverse periods and styles (classical, folk, and popular). (III)
- MUS 1139 Film Music** 4 QH
Surveys the use of music in film and video and gives an overview of the mechanics of synchronization and the psychological implications of applying music to film. Analyzes specific dramatic situations, followed by discussion of such scoring techniques as click tracks and picture recording. Studies films such as *The Informer*, *Alexander Nevsky*, *Citizen Kane*, *Forbidden Planet*, *Woman in the Dunes*, and *Tron*. Discusses the works and careers of specific film composers such as David Raskin, Aaron Copland, Jerry Goldsmith, Sergei Prokofiev, and John Williams.
- MUS 1140 Mozart** 4 QH
Traces Mozart's musical development from child prodigy to mature artist through personal letters and biographies. Analyzes many of his major compositions, including symphonies, concertos, operas, and chamber works.
- MUS 1144 Debussy and the Music of Paris** 4 QH
Recognizes that Claude Debussy, impressionist in sound, composed music that marked a turning point toward modern trends. Covers much of his music for piano, orchestra, and voice, including *Suite Pour le Piano*, *Suite Bergamasque*, *Images* (for piano and orchestra), *Nocturnes*, *La Mer*, and *Pelleas et Melisande*. Discusses the music of Satie, Ravel, and Fauré as it relates to that of Debussy.
- MUS 1145 Beethoven** 4 QH
Analyzes the complex personality and art of Beethoven, his relation to the turbulent times in which he lived, and his role in classical and romantic music. (III)
- MUS 1146 George Gershwin** 4 QH
Studies the life and works of George Gershwin (1898-1937), including popular song, musical comedy, opera, and orchestral compositions. Explores the relationship of George Gershwin to his times, both musically and historically. Takes as a critical starting point Gershwin's famous statement, "My people are American; my time is today."
- MUS 1161 Music Therapy 1** 4 QH
Examines the application of music as a therapeutic vehicle to release suppressed emotions, to encourage self-expression in psychiatric patients, and to treat a wide variety of disorders. Examines music therapy, in a modern approach to health services, as a supplement to other treatments.
- MUS 1162 Music Therapy 2** 4 QH
Examines the etiologies, characteristics, and applications of music therapy with the physically handicapped, hearing impaired, visually impaired, learning disabled, emotionally disturbed, speech/language impaired, and geriatric populations in one-to-one and group settings. In addition, studies improvisations and appropriate music materials for the nonmusician and adapted instrument designs tailored to each disability, while exploring the correlation of music and movement. Compares various musical therapy approaches; includes field trips to musical therapy sites in and around Boston. *Prereq.* MUS 1161.
- MUS 1163 Sound Health** 4 QH
Gives both musicians and non-musicians the opportunity to experience a heightened awareness of the power of music to effect physical and emotional change. Examines the effects of music on the body, mind, and spirit. Begins with an exploration into the awareness of sound and the physiological changes in the body caused by music, and moves through a variety of theories and techniques used to facilitate positive change, relaxation, and reduction of stress. Also considers sound pollution, the effects of vibrations on the body, guided imagery, music and meditation, and new-age environmental music.
- MUS 1165 The Music Industry 1** 4 QH
Examines business-related areas of the music industry. Includes topics such as the make-up and structure of the record industry and music publishing world, the function of performing rights organizations (ASCAP and BMI), and the role of concert and orchestral managers. Includes guests from the various fields who will be invited to lecture in class.
- MUS 1166 The Music Industry 2** 4 QH
Continues MUS 1165. Covers such topics as artist management, theatrical production, concert promotion, and royalties and contracts. Requires students to undertake case studies of local musical organizations, both on and off campus. *Prereq.* MUS 1165.
- MUS 1167 Music Management** 4 QH
Introduces music management, including the structure of non-profit organizations (such as arts service organizations, arts centers, symphony orchestras, chamber orchestras, ensembles, opera companies, and university arts programs) and the structure of profit enterprises. Examines financial management, funding, and audience development. *Prereq.* MUS 1166 or permission of instructor.

- MUS 1170 Music and Technology** 4 QH
Studies the applications of contemporary technology to music. Discusses basic acoustics, analog and digital recording techniques, computer sound synthesis, and the aesthetics of electronic music. Requires no prerequisites in physics or music theory; however, takes into consideration the particular backgrounds of individual students for projects and papers.
- MUS 1171 Computer Literacy for Musicians** 4 QH
Provides students with training in the use of a computer for numerous music applications including music transcription and notation, sequencing, orchestration, sound design, and computer-assisted instruction. Students undertake various projects in each of these areas to prepare themselves for the computer-related components of courses throughout their music curriculum.
- MUS 1172 Introduction to Music Recording** 4 QH
Introduces the history and practice of recording music. Covers recording apparatus; microphones; monophonic, stereophonic, and digital theory and techniques; field recording; studio terminology; basic sound theory; and development of rudimentary editing skills. Also examines the role of the producer versus that of the technician, preparation for recording sessions, and basic legal regulations regarding copyrights and compensation.
- MUS 1173 Music Recording 2** 4 QH
Offers the opportunity to learn additional skills in the recording process such as material marketing and distribution, contracts and negotiations, and establishing distribution channels. Includes hands-on studio production of record-quality material. *Prereq.* MUS 1172.
- MUS 1180 Introduction to World Music** 4 QH
Introduces musical traditions from around the world using ethnomusicological approaches to examine the role of music in culture. Focuses on various world musics from the perspectives of the people who create the music and compares these perspectives with our own.
- MUS 1181 Musics of Africa** 4 QH
Surveys various African musical traditions with respect to their historical, social, and cultural heritage. Examines traditional and contemporary African musics, instruments, and performance traditions. Same as AFR 1156.
- MUS 1182 Music of the Middle East** 4 QH
Presents an introduction to the music of selected Near Eastern and Arab cultures (such as Persian in the East and Ethiopic and Berber in Africa). Includes the cantillation styles and practices of various chants of the Hebrew, Christian, and Islamic traditions.
- MUS 1183 Music of East Asia** 4 QH
Introduces the student to the musical heritage of East Asia by examining music history, the relationship of music cultures to each other, the organization of musical sounds, and music as an aspect of culture. Emphasizes development of basic listening skills.
- MUS 1184 Musics of South America, Latin America, and the Caribbean** 4 QH
Examines the highly diverse and unique musical practices of South America, Latin America, and the Caribbean. Focuses on the traditions of native, African, and European heritage in these geographical areas. Provides exposure to musical repertoires, ideas
- about music, the relationship of music to culture, musical instruments, musical contexts, and musical syncretism.
- MUS 1200 Fundamentals of Music** 4 QH
Provides basic instruction for those who want to learn how to read music or how to write a tune. Gives students the opportunity to learn to sight-read music and to compose in some of the basic forms. Students may elect to take MUS 1210 for one extra credit.
- MUS 1201 Music Theory 1** 4 QH
Continues MUS 1200. Offers the opportunity to improve melodic and rhythmic dictation skills; introduces melodic and harmonic practices to tonal music with additional work in chord and melody construction, leading to the composition of simple four-voice chorales. Students may elect to take MUS 1210 for one extra credit.
- MUS 1202 Music Theory 2** 4 QH
Continues MUS 1201. Focuses on harmonic practices in tonal music. Examines the role and function of harmony through analysis of musical examples and composition of four-voice chorales. Students may elect to take MUS 1210 for one extra credit. *Prereq.* MUS 1201.
- MUS 1203 Music Theory 3** 4 QH
Continues MUS 1202 and focuses on aspects of chromatic harmony. Discusses the construction and function of borrowed chords, altered chords, and non-diatonic harmony. Students may elect to take MUS 1210 for one extra credit. *Prereq.* MUS 1202.
- MUS 1204 Music Theory 4** 4 QH
Introduces the student to methods of musical analysis. Examines phrasing, periodicity, tension-repose, and other structural factors of musical compositions. Students may elect to take MUS 1210 for one extra credit. *Prereq.* MUS 1203.
- MUS 1209 Functional Piano** 4 QH
Gives students the opportunity to develop the keyboard skills appropriate for an undergraduate concentration in music. Studies realization of a figured bass, the harmonization of a melodic line, simple score reading (including treble, bass, alto, and tenor clefs), transposition, sight-reading, and the ability to play any of the major or minor scales. *Prereq.* MUS 1202.
- MUS 1210 Music Theory Lab** 1 QH
Provides both group and individual instruction in ear training, sight-singing, and keyboard skills. This lab can be taken only in conjunction with the department's music theory courses (MUS 1201, MUS 1203, MUS 1204). May be repeated for credit.
- MUS 1211 Sight-singing** 4 QH
Offers students the opportunity to learn how to read music at sight without the aid of a musical instrument, an essential skill for every musician. Emphasizes mastery of the skills of rhythm reading, as well as solfège and triad recognition in all diatonic keys, through class instruction and daily practice. Requires knowledge of the fundamentals of musical notation. *Prereq.* MUS 1201 or equivalent.
- MUS 1230 Chorus** 1 QH
Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor. May be repeated for credit. *Prereq.* Permission of instructor.

MUS 1231 Band

Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor. May be repeated for credit. *Prereq.* *Permission of instructor.*

1 QH**MUS 1232 Chamber Ensembles and Orchestra**

Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor. May be repeated for credit. *Prereq.* *Permission of instructor.*

1 QH**MUS 1233 Early Music Players**

Allows students to participate as performers in one or more ensembles under the direction of a faculty coach. May be repeated for credit. *Prereq.* *Permission of instructor.*

1 QH**MUS 1241 Piano Class 1**

Provides introductory-level study of piano designed for students with or without previous experience. Combines skills in reading music with improvisation and functional piano. Introduces some basic theory to help clarify the structure of class repertoire. Allows students to progress at their own pace. Determines grades by the amount of repertoire mastered during the quarter.

4 QH**MUS 1242 Piano Class 2**

Continues the skills developed in MUS 1241, with emphasis on increasing students' flexibility at the keyboard through the study of scales, transposition, and modulation. *Prereq.* *MUS 1241.*

4 QH**MUS 1244 Voice Class 1**

Gives students the opportunity to learn the basic vocal production required for fine singing. Chooses repertoire, both classical and contemporary, for each student to learn and perform in lessons and before the entire class. Covers the following subjects: diction, the physiology of singing, resonance, registers, and interpretation. Also studies the basics of music reading and sight-singing. Discusses some interpretation and plays recordings of the greatest vocal artists for class analysis. *Prereq.* *Permission of instructor.*

4 QH**MUS 1247 Guitar Class 1**

Provides an introduction to the fundamentals of classical guitar playing for those with or without prior knowledge of the guitar. Covers music reading and theory. Requires students to perform alone and in ensemble with other members of the class. Augments the syllabus by live performances from outside professional and student classical guitarists. Bases final grades on several written examinations and student performance.

4 QH**MUS 1250 Conducting**

Provides instruction in the basic gestures used in conducting vocal and instrumental ensembles. Topics include beat patterns, conveying phrasing and articulation, cueing, controlling tempo and dynamics, score study, and rehearsal techniques. Provides an opportunity for students enrolled in the course to constitute a laboratory ensemble for regular practicum. *Prereq.* *Ability to read music and to sing or play an instrument.*

4 QH**MUS 1261 Music Lessons**

Offers private instruction in voice or in an instrument. Arranges lessons on a half-hour or 45-minute basis. Contact the music department for arrangements. Lab fee.

1 QH**MUS 1265 Jazz Improvisation 1**

Focuses on repertoire as well as performance. Examines the great improvisational artists in American music, such as Charlie Parker, Miles Davis, and John Coltrane. Approaches analysis from a theoretical as well as a practical perspective. Explores the use of rhythm, chords, scales, and modes in the creative improvisation process.

4 QH**MUS 1301 Form and Analysis 1**

Examines representative examples of structural principles governing the melodic, harmonic, rhythmic, and formal components of music. Focuses on music from the sixteenth to the mid-nineteenth centuries. *Prereq.* *MUS 1204.*

4 QH**MUS 1302 Form and Analysis 2**

Continues MUS 1301. Examines works from the late nineteenth century to the present. Includes selected readings by prominent twentieth-century theorists. *Prereq.* *MUS 1301.*

4 QH**MUS 1365 Seminar in the Music Industry**

Offers advanced students the opportunity to explore contemporary events and issues in the music industry. Expects students to apply and distill knowledge accumulated in prior courses. Gives students the opportunity to develop case studies and engage in actual music industry activities such as producing concerts, managing road tours, promoting records, or planning promotional campaigns for musical merchandise marketing. Offers forums for debate on current controversies and developments in the music industry. *Prereq.* *MUS 1166 and junior standing.*

4 QH**MUS 1366 Copyright Law for Musicians**

Explores the unique character of music-related copyright issues. Investigates common law copyright; statutory copyright; ownership, duration, and transfer of copyright; fair use; works for hire; infringements and remedies; public domain works; and international copyright. *Prereq.* *MUS 1166 or permission of instructor.*

4 QH**MUS 1367 Computer Applications in Music Business**

Uses state-of-the-art computer applications in an advanced exploration of the business of music. Investigates computer applications in the record industry, artist management, arts administration, music merchandising, and music publishing. *Prereq.* *MUS 1166.*

4 QH**MUS 1421 Historical Traditions 1: American Music**

Provides an overview of music in the United States in cultural and stylistic contexts. As the first of a sequence of courses for music majors, introduces historical methods of music. Studies a broad range of styles, including folk, popular, and classical musics. *Prereq.* *MUS 1107.*

4 QH**MUS 1422 Historical Traditions 2**

Provides an overview of early Western music, from the middle ages through the seventeenth century in cultural and stylistic contexts. Concentrates on classical music, but will also deal with music as a living language, related to other kinds of music and other arts and made by people for different reasons. Uses scores to help understand the different ways music can be written and the different aesthetic definitions of beauty, pleasure, and meaning in sound. *Prereq.* *MUS 1421.*

4 QH

MUS 1423 Historical Traditions 3**4 QH**

Provides an overview of eighteenth- and nineteenth-century Western music in cultural and stylistic contexts. Covers some of the best-known figures in classical music: Bach, Mozart, Beethoven, and Wagner. Considers why and how the great tradition of tonal music defines classical music even today. Uses scores to help understand the different ways music can be written and the different aesthetic definitions of beauty, pleasure, and meaning in sound. *Prereq.* MUS 1421.

MUS 1424 Historical Traditions 4**4 QH**

Provides an overview of Western classical music in the twentieth century. Concentrates on classical music but also deals with music as a living language related to other kinds of music and other arts and made by people for different reasons. Focuses on both style, often of one great figure, and topic. Looks for parallels between classical music and the other arts and popular musics as well. *Prereq.* MUS 1421.

MUS 1461 Applied Music Lessons**3 QH**

Provides advanced individual instruction in voice or on modern and early instruments. May be repeated for credit. Available only to upperclass students concentrating in music literature and performance. *Prereq.* Permission of instructor and department chair.

MUS 1700 Introduction to Music (Honors)**4 QH**

Honors equivalent of MUS 1109.

MUS 1709 Introduction to Music and the Arts (Honors)**4 QH**

Honors equivalent of MUS 1109.

MUS 1800, MUS 1801, MUS 1802, MUS 1803, MUS 1804, MUS 1805 Directed Study**4 QH each**

Focuses independent work in a selected area of music under the direction of one member of the department. Limits enrollment to qualified students by special arrangement with the supervising faculty member and with the approval of the department chair.

MUS 1810, MUS 1811, MUS 1812, MUS 1813**4 QH each****Junior/Senior Honors Project**

For details contact the honors office.

Courses at the New England Conservatory

Qualified students will be able to take selected courses at the New England Conservatory of Music. Regular academic credit will be granted. For information, contact the chair of the department.

Philosophy and Religion**PHL 1100 Introduction to Philosophy****4 QH**

Introduces students to philosophy by acquainting them with the theories and arguments of classical and contemporary philosophers and by teaching the skills of constructing and analyzing arguments. Emphasizes philosophical inquiry. Covers typical areas such as questions about the basis of morality, free will versus determinism, the existence of God, the problem of suffering, and the nature of knowledge. (II)

PHL 1110 Introduction to Religion**4 QH**

Seeks to identify and appraise different ways of being religious: primitive, mystical, dogmatic, and ritual. Emphasizes appreciating the unique standpoint that each requires, how each sees the

world in a radically different way, and how that leads to distinctive ways of life. (II)

PHL 1130 Ethics: East and West**4 QH**

Is there a best way to live? Is there a way a human being should live? Explores claims in both Eastern and Western philosophy that a way of life exists that leads to happiness, power, and wisdom. Studies the thought of such philosophers as Socrates, Buddha, Plato, Aristotle, Lao Tzu, Epictetus, Marcus Aurelius, Aquinas, and Spinoza, as well as by studying some of the classical Hindu and Buddhist texts. (V)

PHL 1135 Philosophical Problems of Law and Justice**4 QH**

Focuses on two general questions: What is the proper scope of the law? And how should the law be enforced? Under the first question, deals with a number of issues such as whether the law has a legitimate right to restrict such activities as the use of drugs, deviant sexual practices, or gambling. Under the second question deals with the justification of punishment, rehabilitation as an alternative to punishment, and the death penalty. (VI)

PHL 1140 Social and Political Philosophy**4 QH**

Focuses on basic questions about the nature of the state and the relationship of individuals to the state. What basis is there for individuals to obey the laws of the state? What conditions must a government meet to be legitimate? What justification can be given for democratic forms of government? What sorts of controls should the state exert over citizens? What benefits do citizens have a right to expect from the state? Includes readings from both classical and contemporary sources. (V) *Prereq.* 4 QH philosophy.

PHL 1145 Technology and Human Values**4 QH**

Examines the changing values of the modern, technologically advanced world. Attempts to increase our understanding of the supposed breach between the literary and scientific cultures, the diverse approaches toward their reconciliation, and the human dimensions of science and technology. Considers other relevant topics such as the neutrality of technology with respect to good or evil uses, technology as an instrument for human liberation, and the issue of proper and effective modes of controlling technology in today's world. Studies Pirsig's widely read paperback, *Zen and the Art of Motorcycle Maintenance*, as well as Lynn White's *Dynamo* and *Virgin Reconsidered*. Also considers other important writers, including Kurt Baler, Jacob Bronowski, Barry Commoner, Erich Fromm, Karl Marx, and C. P. Snow. (VI)

PHL 1155 The Ethics of Human and Animal Experimentation**4 QH**

Explores the conflicts that arise between the value of free scientific inquiry on the one hand and the rights, vulnerabilities, and suffering of human and animal subjects on the other. Considers traditional issues involving informed consent, voluntariness, coercion, experimental design, risk-benefit analyses, institutional review boards, and professional guidelines, as well as such less traditional issues as the competing conceptions of progress, whether we have obligations to nonhuman animals, and what, if anything, justifies us in treating animals in ways in which we know we should not treat humans. (VI)

PHL 1160 Ethical Issues of Taxation**4 QH**

Explores two basic questions: Is any taxation morally justified? Are there moral grounds for choosing among taxation policies? Covers competing conceptions of private property; the "progressive versus regressive taxation" controversy; the "flat tax" controversy; the alleged problems with interpersonal utility comparisons; and questions involving the distribution of tax

monies, e.g., whether those who have more than they need have any moral obligation to provide for the needs of the poor. (VI)

PHL 1165 Moral Problems in Medicine

4 QH

Examines two fundamental ethical systems, one of which is grounded on the dignity of the person, the other on the intrinsic value of happiness. Then explores the difficult issues of euthanasia, suicide, paternalism, medical experimentation, the patient's right to consent to any therapeutic intervention, and the concept of death with dignity. Examines the larger economic and policy issues of justice, some of which are current in political debates (for example: Is there a right to health care?). Encourages the student to become more sensitive to moral problems as they arise in medical settings, to be better able to deal with these troublesome issues, and perhaps to be more courageous in facing them if that becomes necessary. Also offers an investigation into the questions of abortion, euthanasia, infanticide, genetic counseling, psychosurgery, and human experimentation from the standpoint of both philosophical ethics (such as the theory of the end justifying the means) and religious ethics (such as the natural-law theory of the Roman Catholic Church). (VI)

PHL 1180 Ecology Ethics

4 QH

Investigates the Gaia hypothesis, the view that the earth is a self-regulating ecosystem. Focuses on a current ecological crisis, the greenhouse effect, and on one of its major causes, deforestation. Addresses the values that underlie our concern over this and other ecological crises, whether the values at issue are anthropocentric or biocentric. Explores the ethical implications these ecological concerns have for our individual lifestyles, and for our role as members of communities. Explores how we should live as creative, responsible, and fulfilled beings on the planet. (VI)

PHL 1200 Introduction to Logic 1*

4 QH

Introduces the logic of propositions and the syllogism. Examines principles of critical reasoning and fallacies. Provides practice in applying logical techniques to the creation and criticism of argument. (II) *Students with a strong math background should enroll in PHL 1215.*

PHL 1203 Introduction to Logic 2*

4 QH

Further studies the techniques of logic in the analysis and creation of argument. Explores the logic of predicates, quantifiers, and relations. Provides practice in applying these techniques to natural arguments. Considers the forms of definition and the evaluation of empirical generalizations. (Overlaps PHL 1215.) (II)

PHL 1215 Symbolic Logic*

4 QH

Focuses on the syntax and semantics of propositional logic and first order quantification theory. Considers relations between these systems and natural language. Covers analysis of the notion of derivation within a system, the notion of logical consequence, and practice in analyzing logical structure in natural language sentences. (II) *Recommended for students with a strong math background.*

PHL 1225 Ancient Philosophy

4 QH

Explores classical Greek philosophy; starts with a study/discussion of the roots of Western thought in the sixth century B.C. and argues the reasons for our debt to these original thinkers who were concerned with explaining the principles of external nature and the problems of human knowledge and conduct. Studies

Socrates and his adversaries, the Sophists, and the two major figures he influenced: Plato and Aristotle. Also covers Roman philosophy, the Stoics, and the Sceptics, who are a prelude to the early Christian philosophers of the first century A.D. Places attention on the interplay between philosophers and the moral, social, and religious context in which their thought arises. Emphasizes student participation in class discussion. (III)

PHL 1230 Modern Philosophy

4 QH

Explores the 100 years between 1650 and 1750, sometimes called "the century of genius," a period in which philosophers reacted to the new scientific discoveries of Copernicus, Kepler, and Galileo. Focuses on the development of the rationalist and empirical philosophies during this period, with emphasis on Descartes, Leibniz, Spinoza, Locke, Berkeley, and Hume. (III) *Prereq. 8 QH philosophy.*

PHL 1243 Existentialism

4 QH

Examines existentialist philosophy in its greatest representatives, such as Kierkegaard, Nietzsche, Dostoevski, Heidegger, Jaspers, and Camus, with major attention given to Jean-Paul Sartre and Maurice Merleau-Ponty. Focuses on central themes, including self-alienation, unauthenticity, authenticity, and existential experiences. Examines existential philosophy in its historical, social, and cultural relations, and in its influence on psychology, psychoanalysis, sociology, political science, and literature, both in Europe and in the United States. *Prereq. 4 QH philosophy.*

PHL 1245 Analytic Philosophy

4 QH

Traces the development of the analytic movement from its beginnings in the early works of Moore and Russell. Provides some treatment of Russell's logical atomism, the logical positivists, the thought of Ludwig Wittgenstein, and their widespread influence. *Prereq. 8 QH philosophy.*

PHL 1250 Chinese Philosophy

4 QH

Examines Chinese philosophy in the ancient period (until 221 B.C.). Emphasizes Confucianism, Taoism, and the *I Ching*. Also covers the Logicians, the Mohists, and the Legalists.

PHL 1255 Indian Philosophy

4 QH

Examines the two classical Indian philosophical systems of Hinduism and Buddhism. In examining Theravada Buddhism, explores the view that it is possible for us to live without anxiety or suffering if we overcome our ignorance of reality and master our desires. Next, explores Mahayana Buddhism and its ethics of compassion and its related metaphysics of "voidness." In this part of the course, examines questions that, in the West, are thought of as questions about personal identity and the nature of the self. In exploring Hinduism, studies Vedic mysticism as it comes to us through the Upanishads, as well as the influential ethics of the Bhagavad Gita. Examines the question of whether the method of yoga and meditation is a reasonable method for learning about the fundamental nature of reality.

PHL 1275 Eastern Religions

4 QH

First Explores the fundamental nature of reality. The course first tries to make sense of the difficult notion that the way we perceive reality may be illusory. Examines Theravada Buddhism, a religion that rests on the insights that everything is impermanent and that it is possible to live fully in the present without any suffering. From Theravada Buddhism, the course turns to Hahayana Buddhism, and then to Taoism, a subtle view that emphasizes the "flow" of life and that "the way to do is to be." Next, the

*Students should take either PHL 1200 and PHL 1203 or PHL 1200 and PHL 1215. Credit will not be given for all three courses.

Hinduism of the Upanishads is examined. As part of the exploration of this form of Hinduism, students are given the opportunity to examine meditation intellectually and also to practice a few methods of meditation. In addition, the course investigates the devotional aspect of Hinduism as expressed in the Bhagavad Gita. There will also be an exploration of Zen. (IV)

PHL 1280 Islam 4 QH

Explores the history of Islam, its past and current conflicts with the West, Islamic beliefs, the future of Islam as a world religion, and relations of Islam with Christianity and Judaism. Examines social, political, and legal issues, as well as with the more familiar religious and theological questions. (IV)

PHL 1285 Introduction to Jewish Religion and Culture 4 QH

Explores the basic features of Judaism in the ancient, Rabbinic and Modern periods. Employs an historical critical approach to the formative texts and their interpreters. Analyzes Jewish practices within specific historical contexts and discusses the ways in which practices relate to the texts and history of Judaism. Examines the rich varieties of Jewish cultural expressions.

PHL 1290 Cults and Sects 4 QH

Examines the varieties of religious experience from the perspectives of sociology and psychology of religion. Focuses on such cultic and sectarian groups as Christian Science, the American Shakers, the Unification Church, the Hare Krishna movement, and the Black Muslims. Provides the student the opportunity to acquire critical investigative tools with which to analyze different religious expressions.

PHL 1295 Medicine, Religion, and the Healers' Art 4 QH

Explores aspects of the historical, religious, and cultural context for contemporary alternatives in health care, beginning with an examination of several examples of traditional healing practices and their accompanying religious and philosophical views about human life. Explores this "holistic" tradition in two frames of reference: the ascendancy of scientific rationalism over religion and the takeover, by male-dominated professions, of healing functions that society has traditionally assigned to women (e.g., the rise of obstetrics and the suppression of midwifery). Gives special attention to major women healers of the nineteenth century. Looks at some contemporary efforts at reintegration of scientific and traditional values in the modern health care system. Gives students the opportunity to meet and interact with patients and healers active in the modern holistic health movement.

PHL 1315 Understanding the Bible 4 QH

Introduces students to the Old and New Testaments, so that they can enter into a dialogue with the Bible, understanding not only what it says, but why it is said that way. Focuses on the Bible's social, political, and cultural backgrounds. (III)

PHL 1320 The Meaning of Death 4 QH

Offers an inquiry into different philosophical and religious perspectives on death and life after death, including an examination of some powerful contemporary accounts of personal confrontation with death, along with investigations into attitudes toward death in other traditions for example, Hinduism and Buddhism. In addition, explores responses to the Holocaust in Europe and theories about life after death (such as those discussed in Raymond Moody's *Life After Life* and Ian Stevenson's *Reincarnation*). (V)

PHL 1325 Philosophy of Death, Grief, and Dying 4 QH

Explores fears about death and dying and the grieving process and examines the processes people sometimes experience while dying. In addition, examines current practices of caring for the dying and of coping with bereavement, questioning whether these practices are healthy, helpful, and/or ethical. Examines other relevant ethical issues, including euthanasia, truth-telling with the dying, suicide, and paternalism. Closes with the question of the meaning of life, given the fact that we must die.

PHL 1335 Moral Philosophy 4 QH

Explores two basic questions: What sorts of things are good and bad? What actions are right and wrong? Covers major classical conceptions of ancient Greece and Rome, their replacement by the Western religious ethic, its modification and rejection in the early modern period, and the emergence of modern versions of traditional conceptions of the good life, with reflections on the nature of ethical inquiry itself as a legitimate study. *Prereq.* 4 QH *philosophy or religion or permission of instructor.*

PHL 1340 Aesthetics 4 QH

Offers a historical approach to aesthetics, the philosophical analysis of concepts and the solution of problems that arise when one contemplates beautiful (or ugly) objects. Also explores standards of value in judging art by asking the following questions: What features make objects beautiful (or ugly)? Are there aesthetic standards? What is the relation of works of art to nature? What is the nature of an aesthetic experience? *Prereq.* 4 QH *philosophy.*

PHL 1345 Philosophy of Religion 4 QH

Asks the basic question, "Does God exist?" Examines several major arguments affirming and criticizing the notion of God's existence. Explores a central problem in recent philosophy of religion of whether or not it makes any sense to speak of the truth (or falsity) of religious belief, as well as the implication an answer to that issue has for religious life. *Prereq.* 4 QH *philosophy.*

PHL 1350 Philosophy of Human Nature 4 QH

Offers a philosophical inquiry into the theories of man, man's dimensions, and human nature. Examines the question of the existence of human nature. Pays special attention to contemporary theories of man and self-alienation and their influence in social sciences. Includes selected readings from Descartes, Hobbes, Hegel, Marx, Kierkegaard, Maritain, Freud, Skinner, Fromm, and Frankl.

PHL 1360 Philosophy and Literature 4 QH

Provides the student the opportunity to learn to recognize, appreciate, and criticize philosophical themes in literature. Includes readings from acknowledged classics by philosophical authors such as Voltaire, Dostoevski, and Sartre; popular contemporary authors such as Vonnegut, Barth, and Pynchon; and readings from more straightforward philosophical sources. Examines the meaning of life, the human condition, depersonalization, alienation, human freedom, questions of value, responsibility, rationality, and personal identity. Explores religious, nihilistic, existential, and other viewpoints.

PHL 1370 The Meaning of Life 4 QH

Examines selected philosophical problems of human existence in the contemporary world, with major emphasis on the search for identity and self-fulfillment. Discusses selected problems such as

freedom, death, sexuality, alienation, becoming a person, and peak experiences. Includes readings from Kierkegaard, Heidegger, Sartre, Camus, Maslow, Allport, Frankl, Rogers, and Rollo May.

PHL 1375 Freud, Skinner, and Their Critics

4 QH

Examines fundamental themes and concepts of Freud's psychoanalysis and Skinner's psychology from a philosophical perspective and criticisms of them from the point of view of reformed Freudians and existentialists. Includes selections from Freud, Jung, Adler, Karen Horney, Skinner, Koestler, Pearls, Sartre, Merleau-Ponty, and Kovaly. *Prereq.* 4 QH philosophy or permission of instructor.

PHL 1400 Theory of Knowledge

4 QH

Introduces epistemology, or theory of knowledge, which asks the following questions: What is knowledge? Is knowledge (or even certainty) attainable? What are the limitations of human knowledge? How is knowledge—if we have it—acquired? What roles do reason and experience play in the attempt to attain knowledge? Studies both classical (Rene Descartes and David Hume) and contemporary sources (Bertrand Russell and others). Examines and criticizes various theories of knowledge, such as empiricism, rationalism, and scepticism. Encourages students to form at least tentative opinions on these issues. *Prereq.* 4 QH philosophy or permission of instructor.

PHL 1405 Metaphysics

4 QH

Considers central problems and theories concerning the nature of reality, with special attention to such areas as the relation between mind and matter, free will and determinism, and criteria of existence. *Prereq.* 8 QH philosophy.

PHL 1410 Philosophy of Science

4 QH

Focuses on the nature of scientific method, scientific theories, and scientific explanations. Examines the central question of why science is thought to provide the most reliable account of the nature of reality. Considers various theories about the nature and reliability of science. *Prereq.* 4 QH philosophy.

PHL 1415 Advanced Logic

4 QH

Studies the major results in the meta-theory of first order logic. Examines consistency, completeness, and decidability. Discusses the general notion of an effectively computable process, Church's thesis, and the existence of unsolvable problems. *Prereq.* PHL 1215.

PHL 1435 Philosophy of Mind

4 QH

Seeks to show what puzzles and problems result from an honest attempt to answer these questions in a reasonable way: What is the relation between mind and body? Is the mental merely a function of bodily process and behavior, or does it somehow exist "over and above" the material? How are self-knowledge and knowledge of other minds achieved? What is the relation between words and thoughts? Examines classical sources, such as Descartes and Locke, and contemporary sources, such as Wittgenstein and Putnam. Also seeks to arrive at some answers—however tentative or provisional—to these questions. Constantly challenges the student to think and write well about these difficult subjects. *Prereq.* 4 QH philosophy.

PHL 1440 Philosophy of Language

4 QH

Examines prospects for a theory of language, its syntax, and its semantics. Examines contrasts between theory of reference and

theory of meaning. Asks whether there are universals of language. Analyzes relations between linguistics and psychology. Includes readings from Frege, Quine, Russell, Chomsky, and Fodor.

Prereq. Permission of instructor.

PHL 1550, PHL 1551, PHL 1552, PHL 1553

4 QH each

Junior/Senior Honors Project

For details Contact the honors office .

PHL 1700 Introduction to Philosophy (Honors)

4 QH

Honors equivalent of PHL 1100.

PHL 1740 Social and Political Philosophy (Honors)

4 QH

Honors equivalent of PHL 1140.

PHL 1800 Directed Study

4 QH

Those interested in the directed study program should meet with the department chair. *Prereq.* permission of instructor.

PHL 1888 Great Philosophers Seminar

4 QH

Focuses on the writings of a major philosopher. Subjects include Plato, Aquinas, Locke, Hegel, and Heidegger. *Prereq.* 12 QH of philosophy courses.

PHIL 1890 Seminar in Religion

4 QH

Examines topics including theodicy, cosmogeny, contemporary issues in religion, and comparative ethics. *Prereq.* 12 QH of philosophy and religion courses.

PHL 1891 Major Figures in Religious Studies

4 QH

Focuses on the work of one figure important in the field of religion. Subjects include Augustine, Calvin, Luther, Weber, and Eliade. *Prereq.* 12 QH of religious studies.

PHL 3265 Issues in Medical Ethics

4 QH

Focuses on issues in medical ethics, especially as they are likely to arise in a clinical setting. Begins with exploration of the two basic systems of ethical theory and then concentrates on their application in cases exemplifying the issues of euthanasia, paternalism, experimentation, informed consent, quality of life, professional responsibility, right to health care, truth telling, genetic control, abortion, and the allocation of scarce medical resources. *Prereq.* Permission of instructor.

Physics

Courses are listed according to level and degree of specialization. General interest courses have no prerequisites and may be used to satisfy College of Arts and Sciences distribution requirements in science. Introductory physics courses are basic first-year physics lecture courses; the corresponding labs are listed under "Introductory Physics Laboratories." Advanced physics and astronomy courses require one year of introductory physics and may be used to satisfy degree requirements for physics majors.

General Interest Courses

PHY 1111 Introduction to Astronomy I

4 QH

Offers the nonscience student an introduction to modern astronomical ideas. Includes such topics as introduction to the cosmos; tools of the astronomer (atoms, the nature of light and radiation, telescopes, space astronomy); the earth in space; our

solar system (origin and future of the solar system, the planets and other bodies, the latest from spacecraft flights, the sun as our bridge to the stars); the question of life in the universe. (II)

PHY 1121 Introduction to Science I 4 QH

Provides for nonscience majors an interdisciplinary treatment of the basic ideas of the natural sciences. Discusses concepts such as energy, gravity, and the atom, followed by a consideration of the ways in which atoms combine to form the substances that comprise matter. (II)

Introductory Physics Courses

PHY 1191 Physics for BSET I 4 QH

Focuses on units and scientific notation, force, Newton's first law, static equilibrium, Newton's second law, momentum, work, kinetic energy, potential energy. *Prereq. MTH 1191, which may be taken concurrently; BSET majors only.*

PHY 1192 Physics for BSET 2 4 QH

Focuses on power, rotational motion, Pascal's law, hydrostatic pressure, molecular mass, ideal gas law, first and second laws of thermodynamics, simple harmonic motion, wave motion, sound, and light. *Prereq. PHY 1191; MTH 1192, which may be taken concurrently; BSET majors only.*

PHY 1193 Physics for BSET 3 4 QH

Focuses on electrostatics, circuit elements, direct current circuits, magnetism, electromagnetic induction, electromagnetic waves, atomic and nuclear physics. *Prereq. PHY 1192; BSET majors only.*

PHY 1201 Physics for the Life Sciences I 4 QH

Focuses on vector addition of force, principles of statics; Newton's second law, kinetic and potential energy; pressure static properties of fluids, fluid flow. To take the lab for this course, register for PHY 1501 concurrently. (II)

PHY 1202 Physics for the Life Sciences 2 4 QH

Focuses on wave motion, sound, light, optics, static electricity, DC circuits, magnetism. To take the lab for this course, register for PHY 1502 concurrently. (II) *Prereq. PHY 1201.*

PHY 1203 Physics for the Life Sciences 3 4 QH

Focuses on temperature, gas laws, properties of liquids (surface tension and osmotic pressure), properties of solids, thermal physics, Coulomb's law, and atomic and nuclear physics. *Prereq. PHY 1202.*

PHY 1221 Physics for Science and Engineering Students 1 4 QH

The first quarter of a four quarter sequence intended primarily for engineering students, covers mechanics, kinematics, dynamics, Newton's laws, work, energy, linear momentum, collisions. *Prereq. MTH 1123 or equiv., which may be taken concurrently.*

PHY 1222 Physics for Science and Engineering Students 2 4 QH

Continues PHY 1221. Focuses on rotational equilibrium, harmonic motion, wave motion, sound and electrostatics (including the electric field and electric potential). *Prereq. MTH 1124 or equiv. and PHY 1221, which may be taken concurrently.*

PHY 1223 Physics for Science and Engineering Students 3 4 QH

Continues PHY 1222. Focuses on Ohm's Law, series and parallel circuits, RC circuits, magnetic fields, Maxwell's equations, physi-

cal optics, X-Ray diffraction, and Bohr atom. *Prereq. MTH 1125 or equiv. and PHY 1222, which may be taken concurrently.*

PHY 1224 Physics for Science and Engineering Students 4 4 QH

Focuses on physical optics, special relativity, photoelectric effect, Compton scattering, and quantum mechanics (including the uncertainty principle, the Schrodinger equation, wave functions, the hydrogen atom, and tunneling). *Prereq. PHY 1221, PHY 1222, and PHY 1223 or equiv.*

PHY 1252 Physics Review 1 QH

Offers a calculus-based review for students who have had previous college physics courses not equivalent to the engineering sequence of PHY 1221 through PHY 1224. Covers fundamentals of mechanics, electricity, and magnetism. *Prereq. One year of college physics and knowledge of elementary calculus.*

Introductory Physics Laboratories

PHY 1196 Physics BSET Laboratory 1 1 QH

Covers experiments from various physics topics covered in PHY 1191. Lab fee. *Prereq. PHY 1191 concurrently; BSET majors only.*

PHY 1197 Physics BSET Laboratory 2 1 QH

Covers experiments from various physics topics covered in PHY 1192. Lab fee. *Prereq. PHY 1196; PHY 1192 concurrently; BSET majors only.*

PHY 1198 Physics BSET Laboratory 3 1 QH

Covers experiments from PHY 1193. Lab fee. *Prereq. PHY 1193 concurrently; BSET majors only.*

PHY 1501 Physics Laboratory for the Life Sciences I 1 QH

Accompanies PHY 1201. *Prereq. PHY 1201 concurrently.*

PHY 1502 Physics Laboratory for the Life Sciences 2 1 QH

Accompanies PHY 1202. *Prereq. PHY 1501; PHY 1202 or PHY 1203 concurrently.*

PHY 1521 Physics Laboratory for Science and Engineering Students 1 1 QH

The first of a two-quarter lab sequence in which the student performs experiments from various fields of physics. *PHY 1221 concurrently.*

PHY 1522 Physics Laboratory for Science and Engineering Students 2 1 QH

Continues PHY 1521. *Prereq. PHY 1521; PHY 1222 concurrently.*

PHY 1533 Physics Laboratory for Science Majors 3 1 QH

Focuses on lab experiments related to topics covered in PHY 1233. *Prereq. PHY 1522; PHY 1223 concurrently.*

Advanced Physics and Astronomy Courses

PHY 1301 Intermediate Mechanics 4 QH

Focuses on classical mechanics in two and three dimensions; a review of Newton's laws; special emphasis on conservation theorems for energy, momentum, and angular momentum; harmonic and wave motion. *Prereq. PHY 1232 and PHY 1233; MTH 1243 concurrently.*

PHY 1302 Electric and Magnetic Fields 4 QH

Focuses on the basic concepts of electric and magnetic fields, including electric and magnetic fields in free space and materials;

Maxwell's equations in integral form. *Prereq.* PHY 1301; MTH 1244 concurrently.

PHY 1303 Modern Physics 4 QH

Reviews experiments demonstrating the atomic nature of matter, the properties of the electron, the nuclear atom, the wave-particle duality, spin, and the properties of elementary particles.

Discusses, mostly on a phenomenological level, such subjects as atomic and nuclear structure, properties of the solid state, and elementary particles. *Prereq.* PHY 1233, PHY 1224, or equiv.

PHY 1304 Mathematical Physics 4 QH

Reviews linear algebra and vector calculus, special functions and partial differential equations of physics, potential theory, functions of a complex variable. *Prereq.* MTH 1244 and PHY 1233; MTH 1246 concurrently.

PHY 1305 Thermodynamics and Kinetic Theory 4 QH

Focuses on first and second laws of thermodynamics, entropy and equilibrium, thermodynamic potentials, elementary kinetic theory, statistical mechanics and the statistical interpretation of entropy. *Prereq.* PHY 1224 or PHY 1233, and MTH 1244.

PHY 1401 Classical Mechanics 4 QH

Covers advanced topics in classical mechanics, including vector kinematics, harmonic oscillator and resonance, generalized coordinates, Lagrange's equations, central forces and the Kepler problem, rigid body motion. *Prereq.* PHY 1301 and MTH 1245.

PHY 1402 Electricity and Magnetism 1 4 QH

Covers Maxwell's equations and their experimental basis, electrostatics and magnetostatics, the electromagnetic field in empty space, electromagnetic waves. *Prereq.* PHY 1302, and PHY 1304 or equiv.

PHY 1403 Electricity and Magnetism 2 4 QH

Continues PHY 1402. Focuses on energy and momentum in the electromagnetic field, electrodynamics, the interaction of matter and the field, radiation. *Prereq.* PHY 1402 or equiv.

PHY 1404 Wave Motion and Optics 4 QH

Focuses on harmonic and coupled oscillators, wave equation; geometrical and physical optics; interference, diffraction, optics of solids, amplification of light; and lasers. *Prereq.* PHY 1302.

PHY 1411 Introduction to Astrophysics and Cosmology 4 QH

Introduces the student to current ideas in astrophysics and cosmology, with emphasis on recent advances in this field. Focuses on tools of the astronomer (gamma-, X-, UV-, optical-, infrared-, radio-telescopes, spectroscopes, spacecrafts, and so on); solar system; stellar properties (site luminosity); stellar spectra; Hertzsprung-Russell diagram; stellar energy sources (gravitational, nuclear); evolution of stars (birth, main sequence, red giants, white dwarfs, planetary nebulae, supernovae, neutron stars and pulsars, black holes and gravitational collapse); methods of interstellar and intergalactic distance measurement; our Milky Way galaxy; extragalactic objects (galaxies, clusters of galaxies, radio galaxies, quasars); cosmology (Olber's paradox; recession of galaxies, big bang theory, cosmic background radiation, formation of galaxies, the future of the universe). *Prereq.* Three quarters of elementary physics.

PHY 1413 Introduction to Nuclear Physics 4 QH

Focuses on nuclear structure, nuclear masses, radioactivity, nuclear radiation, interaction of radiation and matter, detectors, fission, nuclear forces, elementary particles. *Prereq.* PHY 1303.

PHY 1414 Introduction to Solid State Physics 4 QH

Offers a semiclassical treatment of the thermal, magnetic, and electrical properties of crystalline solids. Examines X-ray diffraction and the reciprocal lattice, elasticity and lattice vibrations, specific heat, properties of insulators, magnetism in insulators and metals, and introduction to the band theory of metals. *Prereq.* CHM 1383 or PHY 1303; and PHY 1305 or equiv.

PHY 1415 Quantum Mechanics 1 4 QH

Focuses on observation of macroscopic and microscopic bodies, the uncertainty principle, wave-particle duality, probability amplitudes, Schrodinger wave theory, and one-dimensional problems. *Prereq.* CHM 1383 or PHY 1303; and PHY 1304 or equiv.

PHY 1416 Quantum Mechanics 2 4 QH

Continues PHY 1415. Covers discrete and continuous states, Schrodinger equation in three dimensions, angular momentum, general theory of quantum mechanics, applications. *Prereq.* PHY 1415.

PHY 1551 Electronics for Scientists 1 4 QH

With PHY 1552, forms a two-quarter sequence covering electronic techniques for experimental research in many different fields of science. Focuses on principles of semiconductor devices; analog techniques (amplification, feedback, integration); digital techniques (counting, multiplexing, logic); design of electronic subsystems (analog-to-digital converters, phase-sensitive detectors, data-logging systems); understanding specifications of commercial electronic equipment. In lab examples, makes use of up-to-date integrated and discrete devices such as are currently used in the electronic industry.

PHY 1552 Electronics for Scientists 2 4 QH

Continues PHY 1551. *Prereq.* PHY 1551.

PHY 1555 Wave Laboratory 4 QH

Offers a general treatment of the problems of mechanical and electromagnetic radiation as wave phenomena. Focuses on the differential wave equation and its application to selected topics; interference and diffraction theory from the standpoint of the Huygens-Fresnel and Kirchhoff formulations; selected experiments in acoustics, optics, and microwaves to illustrate these problems. *Prereq.* PHY 1224 or PHY 1302.

PHY 1557 Advanced Physics Laboratory 4 QH

Presents special projects in modern experimental physics, including electronic instrumentation used in measuring physical quantities and use of microprocessors. *Prereq.* PHY 1551 and PHY 1552.

PHY 1561 Project Laboratory 4 QH

Allows students to select and carry out individual projects involving instrumentation and computation. Involves the development of some aspect of instrumentation and/or computation in an ongoing research project and the preparation of a final report. The student will be supervised by the project leader and the course instructor. (Although the course carries 4 QH credit, it is

taken in successive winter and spring quarters.) *Prereq.*
Permission of instructor.

PHY 1711 Introduction to Astronomy 1 (Honors)

Honors equivalent of PHY 1111.

PHY 1721 Physics 1

Honors equivalent of PHY 1221

PHY 1722 Physics 2

Honors equivalent of PHY 1222

PHY 1723 Physics 3

Honors equivalent of PHY 1223.

PHY 1724 Physics 4

Honors equivalent of PHY 1224.

PHY 1885, PHY 1886, PHY 1887, PHY 1888

Junior/Senior Honors Project

For details contact the honors office.

Political Science

POL 1110 Introduction to Politics

Offers an overview of basic concepts such as power, authority and sovereignty, methods of political analysis, and contemporary political ideologies. Discusses such dynamics as political culture, public opinion and participation, and political systems. (II)

POL 1111 Introduction to American Government

Analyzes the American system of government and politics. Includes the philosophical origins and design of the Constitution, public opinion, political behavior and participation, parties and interest groups, and formal governmental institutions. May cover cases in domestic and foreign policymaking. (II)

POL 1112 Introduction to International Relations

Applies basic theories of international relations to examining the foreign policies of the key actors in the international system. Covers topics of international aid, trade, and monetary affairs; issues relating to the arms race, nuclear proliferation, arms control, and disarmament; international law and organizations, human rights, and the impact of technology on the functioning of the international system. (II)

POL 1113 Introduction to Foreign Governments

Presents a comparative study of political organization and behavior in selected countries. Includes such topics as political economy, leadership, political institutions, political culture, and political participation.

POL 1260 Public Policy Analysis

Uses both theoretical literature and case studies to analyze the structure of and dynamics inherent in the American policymaking process. Introduces such concepts as problem definition, agenda-development, policy formation, implementation, and program evaluation. Examines basic policy analysis methods. (VI)

POL 1261 Public Administration

Focuses on the theory and practice of public administration, emphasizing the generalities of institutions, processes, and behavior of bureaucratic organizations.

POL 1262 Organization Theory

Provides a broad overview of organization theories, their history, and development. Gives specific attention to developing a paradigm for public organizations that focuses on the relationships of economic, democratic, bureaucratic, technological, and humanistic imperatives. Requires the student to prepare a research paper and consider the implications of this paradigm for future organizations.

POL 1266 Public Personnel Administration

Presents an overall introduction to the field of public personnel administration. Examines selected topics such as recruitment, selection, classification, case development, equal opportunity, public employee unionism, and collective bargaining. *Prereq.* POL 1261.

POL 1267 Public Budgeting

Focuses on the function of budgeting in a variety of governmental contexts, specifically, the appropriations process, the budget as a management tool, and the public policy impacts of the budget. Emphasizes budgeting techniques within this context. *Prereq.* POL 1261.

POL 1301 Research Methods 1

Offers an introduction to the principal quantitative methods used in political analysis, public administration, political behavior, international relations, and policy sciences. Emphasizes basic statistical techniques, survey methods, and SPSS programming. *Prereq.* Middler standing or above, or permission in instructor.

POL 1302 Research Methods 2

Focuses on methods of quantitative analysis. Covers the following primary statistical topics: significance testing, bivariate regression and correlation, and multiple regression and correlation. In addition, teaches elementary computer skills and the use of the programming language Statistical Package for the Social Sciences (SPSS) to calculate advanced statistics. Emphasizes the practical application and understanding of statistical techniques by providing numerous examples in the areas of political behavior, public opinion, and public policy analysis. *Prereq.* POL 1301 and middler standing or above, or permission of instructor.

POL 1303 Political Behavior

Examines selected topics in contemporary political science from a political behavior perspective. Focuses on political attitude formation and change, ideology, socialization, public opinion and voting behavior, political campaigning, political violence, and empirical democratic theory.

POL 1304 Practical Politics

Accentuates and systematically treats some of the problems of organizing for effective citizen action, partisan and nonpartisan, at the grass-roots level. Explores roles in political campaigning.

POL 1306 Politics in Western Europe

Offers a comparative analysis of political culture, federal and unitary forms of government, and executive-legislative relations on the national level in England, France, and West Germany. (III)

POL 1308 The Politics of Poverty

Explores what is referred to as the poverty system: how and why there is poverty, how it affects people's lives, and how it can be eliminated. As a discussion-centered course, relies on simulations, small-group work, and experience-based learning; examines the relations between poverty, racism, and the economic, political, and administrative systems. Evaluates a number of alter-

natives and provides an opportunity for clarifying individual assumptions and feelings about poverty.

POL 1309 International Political Economy 4 QH

Focuses on international political and economic relations. Examines how nations interact in such areas as trade, finance, and labor relations. Includes such topics as the International Monetary Fund, multinational corporations, economic sanctions, military interventions, technology transfer, and foreign aid. *Prereq.* A course in either economics or international politics is recommended, but not required.

POL 1310 American Ideology 4 QH

Analyzes the main American ideologies, including liberalism, neoliberalism, conservatism, neoconservatism, and nationalism. Examines the historic roots of each ideology and its impact on American politics. Explores the ongoing interaction of political ideology and the political process in contemporary American society. (V) *Prereq.* Middler standing or above, or permission of instructor.

POL 1312 Politics and the Mass Media 4 QH

Analyzes several facets of the mass media: the role of newspapers, radio, and television in public opinion formation; their use and effectiveness in political campaigns; their objectivity and/or bias in reporting the news; their impact on political parties and the distribution of power between Congress and the President.

POL 1313 International Organization 4 QH

Focuses on development of international organizations with special emphasis on the United Nations system. (Public Administration elective.)

POL 1314 Interest Groups and Public Policy 4 QH

Surveys the roles of organized interests in American public policymaking. Examines why groups are formed, how they work, why they succeed or fail, and what cumulative impacts groups have on policy. Spans a variety of groups, from traditional economic interests to social movements, public interest organizations, and professional lobbyists.

POL 1316 Contemporary Revolutionary Politics 4 QH

Examines political development in selected revolutionary societies, including Cuba. (VI)

POL 1317 Law and Society 4 QH

Examines the sociological understanding of legal phenomena. Places special emphasis on the role of law in promoting cultural and social cohesion in American society.

POL 1318 State and Local Government 4 QH

Introduces students to the political and administrative context of state and local government and surveys the structure, function, and politics of states and localities within the context of the United States federal system. (Public Administration elective.) *Prereq.* POL 1111.

POL 1320 Parties and Elections 4 QH

Analyzes political parties and the American system of elections. Focuses on structural and constitutional biases, the organizational aspects of the parties, mass voting behavior, the impact of elections on public policymaking, and national and state historical trends.

POL 1321 Eurocommunism 4 QH

Examines the domestic and foreign policies of the Spanish, French, and Italian Communist parties, with special attention to their relations with the international communist movement.

POL 1322 World Politics 4 QH

Emphasizes various principles, techniques, and patterns that governments have followed to implement their goals or objectives. Uses a case study approach, with an emphasis on the problems associated with the Middle East analyzed from the United States-Soviet and Arab-Israeli viewpoints.

POL 1324 Urban Politics 4 QH

Analyzes the political, administrative, economic, and social dynamics of urban areas from a historical perspective. (Public Administration elective.)

POL 1327 Gender Politics 4 QH

Explores the relation between what is and what ought to be—and why—in the roles of women in American politics. Examines the traditional roles of women in politics, the suffrage movement, the woman as citizen and voter, the role of sex in achieving power and in political efficacy, and the place of women in “new politics.” Also covers political action to promote women’s issues and modern feminism. (VI)

POL 1329 American Social Welfare Policy 4 QH

Introduces social welfare policy, with emphasis on programs and services in the contemporary United States. Discusses theoretical frameworks for analyzing social welfare policy; then focuses attention on the substantive areas of welfare, mental health, and social security. Explores various issues and processes related to the design, administration, and implementation of social welfare policy in the context of the American socio-political system. Focuses on social welfare policymaking under the Reagan administration.

POL 1331 Science, Technology, and Public Policy 4 QH

Considers the effects of science and technology on politics and policymaking in America and how politics influences science and technology. Focuses on the differences between scientific and democratic values and definitions of rationality, the nature of public problems, and why some problems are easier to “solve” than others. Particularly looks at such issues as nuclear power, recombinant DNA, abortion, and medical research; addresses the question of who should decide such complex matters. (VI)

POL 1332 Government and Politics of Japan 4 QH

Focuses on the development of Japan’s political system since World War II. Examines Japan’s political institutions and practice of democracy in the context of its political culture; the interrelationship between business and government; Japan’s foreign policy; and business practices and organization. Raises issues concerning Japan’s extraordinary economic success and the limitations of Japan as a model for other countries. (IV) *Not open to freshmen.*

POL 1335 The American Presidency 4 QH

Examines the presidential electoral process and the constitutional and extraconstitutional powers of the American President. Studies presidential leadership styles and analyzes the relationship between the executive branch and Congress, the Court, the bureaucracy, and the media.

- POL 1336 American Constitutional Law** 4 QH
Employing excerpts of United States Supreme Court decisions and other reading materials, attempts to analyze some of the theoretical, structural, and substantive issues inherent in and relevant to the American constitutional system. *Prereq.* POL 1111 and junior or senior standing.
- POL 1337 United States Foreign Policy** 4 QH
Examines formulation and conduct of foreign policy and the United States since 1945.
- POL 1338 Religion and Politics** 4 QH
Explores the role of religion in domestic and international politics. Examines religion as a source of political tension and strife. Draws examples from the United States and the developing world. Covers Islamic fundamentalism in African and the Near East, Orthodox Jewish parties in Israel, Catholic liberation theology in Latin America, and Protestant fundamentalism and the religious right in America.
- POL 1339 Current Political Issues** 4 QH
Analyzes the constitutional and political background of selected contemporary public issues. Primarily for nonpolitical science majors.
- POL 1340 Crisis and Change in Central/Eastern Europe** 4 QH
Studies the rejection of communist party rule in the six former Soviet bloc socialist countries, Albania, and Yugoslavia and examines political, economic, social, and international problems of post-communist development.
- POL 1342 Crisis and Conflict in Black Africa** 4 QH
Using films, maps, news clips, discussions, and readings, explores contemporary politics in African nations south of the Sahara. Studies South Africa, Nigeria, Kenya, and Ethiopia, among others. Examines apartheid, colonialism, Afro-Marxism, chieftaincy, development, and Pan-Africanism. Same as AFR 1342. (VI)
- POL 1343 Politics and Violence in Northern Ireland** 4 QH
Analyzes the causes of violence in Northern Ireland. Considers historical, sociological, and economic roots of the conflict, but places major emphasis on politics. Also discusses the international dimension (the roles of southern Ireland, the United States, and so on), paramilitary organizations, legal political parties and groups, and potential solutions. Draws comparative parallels, including possible lessons for the United States.
- POL 1345 Government and Politics in the Middle East** 4 QH
Approaches the political, economic, military, and ideological factors within the Arab states and Israel, inter-Arab politics, the Arab-Israeli conflict, and the great power rivalry in the region. (VI)
- POL 1347 Russian Politics After Communism** 4 QH
Presents an analysis of the roots of the collapse of the Soviet Union in 1991 and studies problems of political development after communism. Emphasizes the introduction of democracy, the movement toward a market economy, the reorganization of the military, and the control of inter-ethnic strife.
- POL 1348 Russian Foreign Policy** 4 QH
Presents an analysis of the goals, methods, and achievements of Russian policy in the post-Soviet era toward Eastern Europe, Western Europe, the Middle East, Central and East Asia, and the United States, against the background of Soviet behavior toward these areas in the recent past.
- POL 1350 American Legislative Process** 4 QH
Explores the structures, dynamics, and styles inherent in public policymaking within the U.S. Congress. Focuses on elections; representation of constituents' interests; the roles played by members, the president, interest groups, and other actors; and how all of this is affected by the structure of Congress and the processes embedded in the legislative body.
- POL 1351 Techniques and Practices of Public Management** 4 QH
Focuses on practical skills and techniques of public management. Employs the case method in examining typical management problems at different levels of government. Also covers time and resource management for public sector managerial personnel.
- POL 1353 Law and Personal Morality** 4 QH
Examines the use of political power to enforce standards of personal morality and behavior in contemporary American society. Considers such subjects as pornography, sexual privacy and expression, Sunday closing laws, abortion, and prostitution.
- POL 1362 Civil Liberties** 4 QH
Employing United States Supreme Court decisions and other reading material, examines the substantive and procedural guarantees of the Bill of Rights and the Fourteenth Amendment and their relation to a liberal democratic society.
- POL 1364 Business and Government Relations** 4 QH
Surveys the relation between economic developments and political processes in the United States. Considers government planning of the economy, monopoly and government regulation, government programs to promote social welfare, and the impact of Federalism on the political-economic system, among other topics.
- POL 1368 Government and Politics of Latin America** 4 QH
Examines the governmental systems, political parties, socioeconomic problems, and foreign policies of Latin American states. Focuses on political change. (IV)
- POL 1369 Political Violence** 4 QH
Analyzes political violence in its various contemporary forms (for example, revolution, genocide, political terrorism, military overthrows). Assesses the causes and consequences of political violence (from both practical and moral points of view) and considers strategies for preventing and resolving political violence.
- POL 1371 Government and Politics of China** 4 QH
Focuses on China's political system during Communist party rule. Addresses fundamental issues that the government has been unable to resolve successfully including leadership recruitment and succession; economic growth; class and class struggle; political culture and the educational system; the nature of socialist democracy and socialist legality; and the appropriate form of socialism for a country wishing to modernize rapidly. Examines the interaction among ideology, development, and culture on these issues. (IV) *Prereq.* Sophomore standing or above.
- POL 1373 Pre-Modern Political Thought** 4 QH
Presents an analytical and historical examination of the great political thinkers and the main trends of political thought from

classical Greece to the Renaissance. (V) *Prereq.* Junior standing or permission of instructor.

POL 1374 Modern Political Thought 4 QH
Presents an analytical and historical examination of the great political thinkers and the main trends in political thought from the Renaissance to the twentieth century. (V) *Prereq.* Sophomore standing or above.

POL 1379 Marx and Marxism 4 QH
Studies the social and political thought of Karl Marx. Examines the development of Marxian theory after Marx's death. Discusses class struggle, social revolution, and communism. (V)

POL 1382 Intergovernmental Relations 4 QH
Analyzes the relationships among national, state, and local levels of government in the United States and the changing patterns of those relationships.

POL 1384 Arab-Israeli Conflict 4 QH
The Arab-Israeli confrontation has its own dynamics, and its nature has changed through the decades. This course analyzes its effects on the internal politics of the Arab states and Israel, Pan-Arab politics, and the role of the great powers in the region. (VI)

POL 1386 International Law 4 QH
Focuses on territory and jurisdiction of states, treaties, recognition, peaceful settlement of disputes, resort to force. *Prereq.* POL 1112.

POL 1388 Political Polling and Survey Research 4 QH
Examines the entire survey research process, which is the most common approach to program evaluation survey design, sampling, questionnaire design, survey administration, data processing, and data analysis. Also involves some statistical analysis. *Prereq.* POL 1301.

POL 1389 American National Security Policy 4 QH
Traces the evolution of American national security policy in the post-World War II period. Considers American nuclear military policy and conventional non-nuclear military policy. Explores arms control policy.

POL 1410 Seminar in American Government 4 QH
Offers an in-depth study of selected topics in American government. *Prereq.* Senior political science major and permission of instructor.

POL 1411 Seminar in International Relations 4 QH
Offers an in-depth study of selected topics in international relations. *Prereq.* Senior political science major and permission of instructor.

POL 1413 Senior Seminar in Political Science 4 QH
Offers an in-depth study of selected topics in political science. *Prereq.* Senior political science major.

POL 1415 Seminar in Public Law and Social Issues 4 QH
Explores the various attempts to give law a satisfactory philosophical foundation and the major critiques of the role of law in modern society. Places special emphasis on the attempt by courts to render justice in various areas of law. The central issue is whether law is a source of objective and determinate, rather than

merely personal or political, answers to contentious legal questions. *Prereq.* Junior or senior standing.

POL 1710 Introduction to Politics (Honors) 4 QH
Honors equivalent of POL 1110.

POL 1711 Introduction to American Government (Honors) 4 QH
Honors equivalent of POL 1111.

POL 1712 Introduction to International Relations (Honors) 4 QH
Honors equivalent of POL 1112.

POL 1800, POL 1801, POL 1802 Directed Study 4 QH each
Offers independent work on chosen topics under the direction of members of the department. *Prereq.* Junior or senior standing and permission of instructor.

POL 1803 Internship in Politics 4 QH
With department approval, students engage in a political or governmental internship under the supervision of a faculty member. *Prereq.* Junior or senior standing normally required.

POL 1804 Practicum in Lobbying 4 QH
Offers fieldwork opportunity for students to become involved in supervised lobbying activity on the national or state levels of politics. (May be taken only once for academic credit.) *Prereq.* Middler, junior, or senior standing.

POL 1806 Political Science Honors Program Minicourse 1 QH
Deals with specialized topics in political theory.

POL 1807, POL 1808, POL 1809, POL 1810 4 QH each
Junior/Senior Honors Project
For details contact the honors office.

Psychology

Psychology majors must complete the following courses:

PSY 1110 Perspectives in Psychology I 4 QH
Surveys the fundamental principles and issues of the major areas of contemporary scientific psychology. Approaches the study of psychology as a method of inquiry as well as a body of knowledge. Emphasizes biological bases of behavior, principles of learning and motivation, psychological testing, personality dynamics, psychopathology, and therapeutic approaches. *Students who earn credit for PSY 1111 will not earn credit for PSY 1110. (II)*

PSY 1111 Foundations of Psychology I 4 QH
Surveys the fundamental principles and issues of the major areas of contemporary scientific psychology. Approaches the study of psychology as a method of inquiry as well as a body of knowledge. Emphasizes biological bases of behavior, principles of learning and motivation, psychological testing, personality dynamics, psychopathology, and therapeutic approaches. Requires research participation in psychology experiments (or alternative). *Students who earn credit for PSY 1110 will not earn credit for PSY 1111.*

PSY 1112 Foundations of Psychology 2 4 QH
Continues PSY 1111, emphasizing the areas of lifespan development, sensory and perceptual processes, states of consciousness,

cognition, language, memory, emotion, and social influences on behavior. Requires research participation in psychology experiments (or alternative). (Overlaps PSY 1113.) *Prereq.* PSY 1110 or PSY 1111.

PSY 1113 Perspectives in Psychology 2 **4 QH**

Continues PSY 1110, emphasizing the areas of lifespan development, sensory and perceptual processes, states of consciousness, cognition, language, memory, emotion, and social influences on behavior. (Overlaps PSY 1112.) (II) *Prereq.* PSY 1110 or PSY 1111.

PSY 1210 Research Methods in Psychology **4 QH**

Introduces research methods in psychology such as field research, content analysis, case research, survey methods, simulations, and laboratory experiments. Examines issues of research fairness and evaluating research methods. Explores basic statistical notions including sampling, variability, and correlation. *Prereq.* PSY 1112 or PSY 1113.

PSY 1211 Statistics in Behavioral Science 1 **4 QH**

Introduces descriptive statistics (scales of measurement, frequency distribution and graphs, measures of central tendency, dispersion and correlation, standard scores, and the unit normal curve) and probability theory (permutations, combinations, and the binomial theorem). *Prereq.* MTH 1101 or MTH 1107.

PSY 1212 Statistics in Behavioral Science 2 **4 QH**

Offers a general presentation of hypothesis testing, including parametric and nonparametric tests, with emphasis on formulating hypotheses and choosing appropriate scales of measurement, tests, and confidence levels. *Prereq.* PSY 1211.

PSY 1215 Sexual Behavior **4 QH**

Focuses on the sexual activities of the human male and female from infancy to adulthood. Considers the importance of sexual factors in the life history of the individual, statistical surveys of sexual behavior, and direct observational measures of sexual responding. Explores the nature of love, responses to pornography, prostitution, bisexuality, male and female homosexuality, rape, child abuse, and sexual therapy.

PSY 1216 Researching Consciousness **4 QH**

Introduces the varied scientific approaches to the study of consciousness and the diverse and theories of consciousness and the mind. Explores biology and consciousness; drug-induced states of consciousness, dreaming; hypnosis, meditative states, pain perceptions, animal minds, and anomalous psychology (e.g., near-death experiences and ESP). Examines data, theory, and methodological and conceptual problems.

PSY 1218 Psychology of Women **4 QH**

Introduces the student with little or no background in psychology to the current theories and research on the psychology of women. Critically examines psychological, biological, and social influences on gender differences, gender roles, and gender stereotypes in the light of scientific evidence and individual experience. Assesses their consequences for society. Uses the unique perspective generated in the field of the psychology of women to evaluate traditional research methods in psychology as well as the major psychological theories formulated to explain women and the differences between women and men. Emphasizes critical-thinking skills.

PSY 1220 Biological Basis of Mental Illness **4 QH**

Examines current hypotheses of brain dysfunction involved in mental illness. Explores the field of biological psychiatry including events in the brain that can be linked to mental disorder. Studies current neurochemical and genetic theories of diseases such as schizophrenia and depression. Emphasizes recent research and critically assesses treating mental disorders biologically, such as with drug therapy.

PSY 1231 Learning and Motivation 1 **4 QH**

Offers an introduction to the basic learning and motivational principles that permit humans and animals to adapt effectively to a changing environment. Emphasizes research and theories of operant and Pavlovian conditioning, with discussions of discriminations and generalization, avoidance and punishment, acquired motivational states (for example, addiction), concept formation, biological constraints on learning and behavior, animal cognition, and other related topics. Relates learning and motivational principles to the understanding and treatment of behavioral, affective, cognitive, and motivational disorders. *Prereq.* PSY 1112 or PSY 1113.

PSY 1241 Developmental Psychology **4 QH**

Examines changes in social relationships, moral reasoning, language, cognition, sensation and perception, personality, and sex roles that occur with development from infancy through adolescence. Examines major theories of development regarding the role of biology, social learning, and peer and parental influences. Explores individual differences (in attachment and temperament, for example) and research issues relevant to the study of children. *Prereq.* PSY 1112 or PSY 1113.

PSY 1242 Adult Development and Aging **4 QH**

Examines theories of adult personality development and views on the stability of personality over time. Explores changes from young adulthood onward in sexuality, heterosexual relationships, friendships, and occupational roles as well as age-related differences in learning, memory, intelligence, and physical functioning. Attention is also given to issues surrounding family violence, age-related changes in mental health and suicide rates, death and dying, ageism, and intergenerational relations. *Prereq.* PSY 1112 or PSY 1113.

PSY 1243 Infant Development **4 QH**

Focuses on the fact that during the first two years of life, the basic physical perceptual, cognitive and emotional capacities emerge and interact in the development of such complex behaviors as visually guided movement, the formation of social attachments, and the emergence of language. Provides an introduction to this critical period of human development; emphasizes how the infant's biological inheritance interacts with the physical and social environment in the generation of these important abilities and behaviors. *Prereq.* PSY 1241 or ED 1102.

PSY 1251 Food, Behavior, and Eating Disorders **4 QH**

Investigates what starts and stops eating behavior. Examines taste, nutrition, metabolism, the brain, food experiences, and societal factors that control feeding behavior. Emphasizes the biological/psychological interaction in normal eating and in pathological eating, such as anorexia, bulimia, and extreme obesity.

PSY 1262 Psychology of Language **4 QH**

Provides a basic introduction to psycholinguistics. Topics include the nature and structure of languages, processes involved in the

production and comprehension of language, the biological bases of language, and aspects of language acquisition. Examines current theories of language processing and related experimental findings. *Prereq.* PSY 1112 or PSY 1113.

PSY 1263 Nonverbal Communication 4 QH

Examines the messages we send by posture, facial expression, gesture, gait, and interpersonal distance. Also explores how power, status, and gender affect nonverbal communication. *Prereq.* PSY 1112 or PSY 1113.

PSY 1271 Social Psychology 4 QH

Provides an introductory survey of social psychology. Focuses on aggression, attribution, attitude formation, change, measurement, conformity, impression formation, group processes (social facilitation, deindividuation, for example). *Prereq.* PSY 1112, PSY 1113, or permission of instructor.

PSY 1272 Personality I 4 QH

Offers a systematic study of the normal personality and its development. Focuses on behavioral, dynamic, and constitutional determinants, assessment of personality, research; surveys the major theories of personality. *Prereq.* PSY 1112 or PSY 1113.

PSY 1273 Personality 2 4 QH

Continues PSY 1272. *Prereq.* PSY 1272.

PSY 1274 Psychology and the Law 4 QH

Traces the effects of psychological factors through the course of a trial, including such issues as accuracy of eyewitness identification, plea bargaining, jury selection, persuasion tactics in the courtroom, presumption of innocence, jury size, jury decision rules, and sentencing and punishment.

PSY 1330 Evolution of Affiliative Behavior 4 QH

Explores the neural and evolutionary roots of attachment behavior between organisms. Examines materials from a variety of animal species (including humans), genetic and environmental factors, anthropological studies of early hominid societies, courtship and reproductive rituals in primates and lower organisms, neuronal differences between genders, and socio-biological approaches to affiliative behavior. *Prereq.* PSY 1241, PSY 1271, PSY 1272, PSY 1351, PSY 1353, or permission of instructor.

PSY 1351 Psychobiology 4 QH

Focuses on the relation between brain function and human behavior. Examines how nerve cells function individually and work together both in small networks and in the nervous system; the structure of the nervous system; how our sense organs provide the nervous system with information about the outside world; how the brain controls movement; and how psychological concepts from motivation to language and memory are represented in the brain. *Prereq.* PSY 1112, PSY 1113, or permission of instructor.

PSY 1353 Animal Behavior 4 QH

Surveys animal behavior in a wide range of species (reptiles, birds, fish, and mammals, including humans) to find similarities and differences in the behavioral processes and physiological mechanisms by which individual organisms and species adapt to their environments. In the first section, focuses on adaptive specializations exhibited by animals in learning about their environments during early development and as adults. In the second section, examines problems of social organizations at the individual level: how animals communicate with each other and transmit

“cultural” skills; mechanisms underlying cohesion and dispersal (for example, reproduction and aggression); and the adaptive advantages of being social or asocial. In the final section, provides students with an unusual opportunity to apply concepts and experimental methods they have learned by actually doing a short field study of animal behavior at the Boston Zoological Park. *Prereq.* PSY 1112, PSY 1113, or permission of instructor.

PSY 1361 Introduction to Phonetics 4 QH

Offers an introduction to the nature of the speech signal from articulatory, perceptual, and acoustic points of view. Focuses on sound measurement, sound classes, and a survey and comparison of speech sounds used in languages in the world. Studies stress, tone, and intonation. Examines phonetic classification and transcription of speech as practical tools for students of languages, linguistics, and speech and hearing science. *Prereq.* PSY 1262 or permission of instructor.

PSY 1362 Child Language 4 QH

Examines how language develops in children. *Prereq.* PSY 1262, linguistics, or permission of instructor.

PSY 1364 Cognition 4 QH

Provides a basic introduction to human cognition. Topics include pattern recognition, attention, memory, categorization and concept formation, problem solving, and aspects of cognitive development. Examines current theories of cognitive processing and related experimental findings. *Prereq.* PSY 1112 or PSY 1113.

PSY 1365 Language and the Brain 4 QH

Focuses on linguistic behavior from a neuro-psychological viewpoint. Examines models of how the nervous system, and the brain in particular, controls the production, perception, and internal manipulation of language. Considers localization of cerebral functions and hemispheric lateralization; experimental and clinical evidence for functional models; aphasia and other language pathologies; schizophrenic language; evidence from “slips of the tongue”; and the bilingual brain. Compares speech, sign language, and writing systems. Also discusses interpretation and translation. *Prereq.* PSY 1262 or permission of instructor.

PSY 1371 Industrial/Organizational Psychology 4 QH

Surveys the psychological fundamentals underlying performance in work settings. Topics include psychological testing, performance evaluation, training, motivating, and leading employees, and the social psychology of organizations. Emphasizes ethical and affirmative action issues. *Prereq.* PSY 1271 and PSY 1211.

PSY 1373 Abnormal Psychology I 4 QH

Focuses on the abnormal personality, including a historical survey and a discussion of such issues as anxiety, defense mechanisms, and the criteria of psychopathology. Also examines the symptomatology, etiology, and dynamics of neuroses (hysteria, phobia, obsession, and compulsion) and of psychosomatic disorders. Discusses case histories. *Prereq.* PSY 1112 or PSY 1113.

PSY 1374 Abnormal Psychology 2 4 QH

Offers a survey of psychological and somatic therapies. Examines symptomatology, etiology, dynamics, and therapy of psychoses (schizophrenia, paranoia, mania, depression). Also discusses sociopathic and organic disorders. *Prereq.* PSY 1373.

PSY 1381 Sensation 4 QH

Provides an introduction to the study of our senses, with emphasis on hearing, touch, taste, and smell. Focuses on how we mea-

sure our sensory abilities and relates findings to the functioning of sensory organs—ears, skin, mouth, and nose—and of the sensory nervous system. *Prereq. PSY 1112 or PSY 1113; PSY 1351 is highly recommended.*

PSY 1382 Perception **4 QH**
Offers a study of our awareness of the world around us, exemplified primarily by visual perception. Covers light, visual sensory mechanisms, color vision, illusions, consciousness, and dreams. *Prereq. PSY 1112 or PSY 1113; PSY 1351 is highly recommended.*

PSY 1410 Systems and Theories of Psychology **4 QH**
Presents in an historical context the core ideas and theoretical positions encountered by students in previous courses. Examines different systematic orientations such as structuralist, functionalist, Gestalt, psychoanalytic, behaviorist, cognitive, and humanistic psychology to demonstrate the extent to which the systems influence contemporary American psychology. *Prereq. Junior or senior status in psychology major or permission of instructor.*

PSY 1431 Behavior Therapies **4 QH**
Offers a study of successful projects that have provided effective remediation and rehabilitation in institutions for the mentally ill, the mentally retarded, and the developing human (schools). *Prereq. PSY 1231 or permission of instructor.*

PSY 1451 Psychopharmacology **4 QH**
Examines interactions between drugs, brain, and behavior. Focuses on such topics as synaptic transmission, behavioral functions of specific neurotransmitter systems, pharmacological treatment of mental and neurological disorders, and drug abuse. *Prereq. PSY 1351 or equiv. with permission of instructor.*

Directed Studies — Honors Courses

PSY 1710 Perspectives in Psychology 1 (Honors) **4 QH**
Honors equivalent of PSY 1110. (II)

PSY 1713 Perspectives in Psychology 2 (Honors) **4 QH**
Honors equivalent of PSY 1113.

PSY 1770 Honors Directed Study **4 QH**
For details contact the undergraduate coordinator in the psychology department, 125 Nightingale Hall.

PSY 1890, PSY 1891, PSY 1892, PSY 1893, PSY 1894 Directed Study **4 QH each**
Offers independent work under the direction of the psychology department, usually in a research project in one of the department labs. Faculty members normally require completion of advanced lab courses in the area of research interest, but this is a matter of individual discussion. Students interested in directed study should consult a departmental adviser. *Prereq. Permission of instructor.*

PSY 1895, PSY 1896, PSY 1897, PSY 1898 **4 QH each**
Junior/Senior Honors Program
For details contact the honors office.

Laboratories

PSY 1511 Experimental Design in Psychology **4 QH**
Focuses on the experimental method in the design, execution, analysis, and reporting of psychological investigations of humans and animals. *Prereq. PSY 1112 or PSY 1113 and PSY 1212.*

PSY 1530 Experiments in Learning and Motivation **4 QH**
Gives students the opportunity to assess the generality, specificity, and robustness of learning and motivational principles through human laboratory studies and field experiments with free-ranging feral animals. Involves designing and conducting experiments and writing reports on operant and Pavlovian conditioning, adjunctive behavior, biofeedback, concept formation, and related topics. Focuses on the theoretical and clinical implications of experimental findings. This course does not use laboratory animals. *Prereq. PSY 1231 and PSY 1211.*

PSY 1531 Learning and Motivation Laboratory **4 QH**
Gives students the opportunity to gain proficiency, through direct experience, in lab analysis of behavior and in evaluating common generalizations about human behavior. Expects students to design and perform experiments in animal and human learning, memory, decision processes, concept formation, and other topics of individual interest. *Prereq. PSY 1212 and PSY 1231.*

PSY 1551 Laboratory in Psychobiology **4 QH**
Introduces the methods of research in psychobiology. Expects students to work in small groups, conducting three to four hands-on laboratory exercises under supervised conditions. Expects students to read selections of the relevant scientific literature, analyze the collected data, and write experimental reports. *Prereq. PSY 1351 or permission of instructor.*

PSY 1562 Psycholinguistics Laboratory **4 QH**
Provides students the opportunity to acquire first-hand experience in conducting research on issues in the psychology of language. Focuses on classical experiments and their implications for broader issues of language processing. Involves students in all aspects of each experiment, including collecting and analyzing data and preparing lab reports. *Prereq. PSY 1212 and PSY 1261 or PSY 1364.*

PSY 1564 Cognition Laboratory **4 QH**
Provides students the opportunity to acquire first-hand experience in conducting research on issues in human cognition. Focuses on classical experiments and their implications for broader issues of cognitive functioning. Involves students in all aspects of each experiment, including collecting and analyzing data and preparing lab reports. *Prereq. PSY 1212 and PSY 1364 or PSY 1262.*

PSY 1571 Laboratory in Social Psychology **4 QH**
Provides an introduction to the methods of social-psychological research. Assists students in developing the ability to read published social research with a critical eye, to pose questions in a testable manner, to apply experimental methods to social research, and to express themselves in APA journal style. *Prereq. PSY 1212 and PSY 1271.*

PSY 1572 Personality Laboratory **4 QH**
Provides an introduction to the methods and areas of personality research. Discusses problems of measurement, control, and interpretation. Critically examines representative published experiments. Expects students to design, collect data for, assess, and write up several experiments, including one original research project. *Prereq. PSY 1212 and PSY 1272.*

PSY 1581 Sensation and Perception Laboratory **4 QH**
Focuses on experiments involving precise measurements of both physical and psychophysical phenomena, including auditory func-

tion, color vision and after-effects, muscular sensation, tactile sensitivity, and adaptation to perceptual distortions. *Prereq.* PSY 1212 and PSY 1381 or PSY 1382.

Seminars

PSY 1610 Psychological Research and Personal Values 4 QH

Examines ethical concerns and values in designing and applying research, in setting research goals, and in using research subjects. Develops strategies for reflecting on ethical concerns from historical, psychological, philosophical, sociological, and spiritual perspectives, and for putting personal values into action through innovation, advocacy, career decisions, etc. *Prereq.* Any laboratory course in psychology and research or co-op experience in psychology.

PSY 1614 Seminar on Heredity and Society 4 QH

Focuses on the origins of the intelligence testing movement and the movement's relation to eugenics and to behavior genetics. Studies history, methods, substantive findings, and social implications of psychological measurement and testing. Examines the extensive research literature on intelligence testing and the nature/nurture problem in areas such as psychopathology, criminality, and alcoholism. *Prereq.* Permission of instructor.

PSY 1632 Seminar in Behavior Modification 4 QH

Discusses topics in behavior modification in a seminar format. *Prereq.* PSY 1231, PSY 1531, or permission of instructor.

PSY 1651 Seminar in Psychobiology 4 QH

Offers intensive study, discussion, and practice in lab studies of physiological variables. Covers evolution of the nervous system, sensory and motor mechanisms, motivation and emotion, sleep, attention and perception, learning, and memory. *Prereq.* PSY 1351 or permission of instructor.

PSY 1661 Seminar in Psycholinguistics 4 QH

Focuses on the on-line processing of language. Discusses recent research in light of such questions as, While listening to someone speak, how does the listener process the information carried by the acoustic signal? What is the role of linguistic rules, prediction strategies, and contextual information? And when speaking, what processing stages are involved from the moment the speaker decides to speak to the moment the articulators start functioning? Examines these and other questions, as well as experimental techniques and current trends in psycholinguistics. *Prereq.* PSY 1262 or permission of instructor.

PSY 1662 Seminar in Cognition 4 QH

Varies in subject matter by term. *Prereq.* PSY 1364.

PSY 1671 Seminar in Social Psychology 4 QH

Expects students to examine and present in class their findings on a particular topic in social psychology, such as attribution, aggression, conformity, attitude-behavior relationship. *Prereq.* PSY 1271 or permission of instructor.

PSY 1672 Seminar in Clinical Psychology and Personality 4 QH

Offers seminar presentations of topics relevant to understanding the normal and disturbed personality. Covers topics such as specialized assessment procedures, cognitive styles in personality, temperament, hypnosis, anxiety, aggression, specialized clinical syndromes, and the development of conscience. *Prereq.* PSY 1373 or permission of instructor.

PSY 1681 Seminar in Sensation and Perception 4 QH

Expects students to present in class their finding on topics such as how perceptions are organized, formed, and modified by sensory, attentional, motivational, and cognitive factors, how our sensory systems extract information from the environment in a consistent and lawful manner, despite large changes in environmental conditions, and how to account for this in physiological terms. *Prereq.* PSY 1351 and PSY 1381 or PSY 1382.

Sociology

SOC 1100 Introduction to Sociology 4 QH

Explores basic concepts and theories concerning the relation between individuals and society. Emphasizes the influence of culture, social structure, and institutions in explaining human activity. Discusses and analyzes social groups, socialization, community, class, power, and social change, among other substantive issues.

SOC 1101 The Sociology of Everyday Life 4 QH

Examines the development, application, and consequences of rules for everyday activities (for example, walking, talking, eating, drinking, sitting, smoking, laughing, crying, and sleeping). Considers the effects of artifacts, culture, space, and territory on these activities, on social life, and on the expression of emotions.

SOC 1102 Social Inequality and Communication 4 QH

Analyzes the ways in which groups and institutions, in both their ritual and everyday activities, communicate the idea of hierarchy and an individual's place in it through face-to-face interaction, formal communication, and the use of space and time. Takes a dramaturgical approach to social organization, with special emphasis on status images in the media and the communication of social place by service organizations and professional groups. Includes some content analysis and observational fieldwork.

SOC 1103 American Society 4 QH

Focuses on American society, culture, and major social institutions: economic, religious, governmental, familial, educational, welfare, and recreational. Examines social classes and stratification, mobility, and individualism. *Prereq.* SOC 1100 or equiv.

SOC 1104 Contemporary Japanese Culture and Society 4 QH

Focuses on contemporary Japanese urban society. Examines major values, family structure, sex roles, social control, the economy and the division of labor, mass media, religion, arts, and social problems. (IV)

SOC 1105 Society and Culture in Russia and the Former Soviet Union 4 QH

Focuses on contemporary Russian society. Emphasizes the social, economic, and political reforms of the Gorbachev period and the ways in which the Soviet Union has evolved since 1917 and in the post-Soviet period. (IV)

SOC 1120 Sociology of Boston 4 QH

Examines Boston from the perspectives of environmental development, neighborhood and intergroup relations, institutional services, and symbolic meanings. Explores current issues in the city through term projects. Requires field trips.

SOC 1121 Doing Sociology 4 QH

Takes a research approach to sociology. Focuses on students' participation in their own learning about sociology as a body of

knowledge and as a method of studying social life. Requires students to use the computer during the course. (II)

SOC 1125 Social Problems 4 QH

Analyzes in both empirical and theoretical terms many of the social problems currently facing Americans. Focuses on the deepening inequality and poverty among working and middle-class Americans, particularly racial minorities, women, and youth; related problems of racism and sexism; the disintegration of the family; growing unemployment; the international ecological crisis; the deterioration of the health system; crime; war and militarism; and strategies and political options for solving these problems.

SOC 1135 Social Psychology 4 QH

Examines the effects of social interaction on individual behavior. Surveys major theoretical orientations and substantive topics such as presentation of self, effect of television, conformity in fads, gossip and rumor, mass and serial murder, and bystander apathy.

SOC 1140 Sociology of Prejudice and Violence 4 QH

Examines factors in the development and maintenance of prejudice and discrimination. Discusses American race relations, anti-Semitism, sex roles, and stereotyping.

SOC 1146 Environment and Society 4 QH

Examines the political economy of the global environmental crisis. Topics vary from quarter to quarter and include such issues as world resource availability, energy, pollution, ecological degradation in the Third World, environmental policy, and social movements. Involves practical experience in environmental problem solving. (VI)

SOC 1147 Urban Social Problems 4 QH

Focuses on the foundations of urban life in historical perspective. Analyzes relation of city life to environment, population, social organization, technology and cultural values. Examines growth trends, urbanization, urban planning, and citizen action.

SOC 1150 Introduction to Women's Studies: Image, Myth, and Reality 4 QH

See INT 1150 for course description.

SOC 1155 Sociology of the Family 4 QH

Focuses on the family as a social institution in several selected cultures; interrelations of the family and political, economic, and educational institutions; social nature of personality; role taking; individualism, mobility, and industrialism. (V)

SOC 1156 Violence in the Family 4 QH

Examines physical, emotional, and sexual violence in families, with emphasis on child, sexual, and spouse abuse. Covers definitions, prevalence, causes, prevention, and treatment of specific cases of domestic violence. Focuses on social policy issues and problems of legal intervention in cultural and family issues.

SOC 1160 Gender in a Changing Society 4 QH

Considers why and how gender is constructed in American society, and looks at different theories of gender. Includes topics such as the expression of gender in everyday life; its development in childhood; its centrality in the traditional family, the workplace, and sexuality; and its role in violence against women.

SOC 1165 Students, Schools, and Society 4 QH

Emphasizes the role of education in processes of socialization, social mobility, social control, and social change. Do social characteristics (sex, race, class, age, physical status) influence the school experience? Do schools provide opportunity and initiate change, or do they perpetuate the status quo in economic, political, and social life? Who goes to school, where, for how long, and with what result? How does educational advantage get translated into jobs and social status? Encourages students to draw on their own experiences to develop paper topics.

SOC 1168 The Social Movements of the 1960s 4 QH

Considers the social and cultural movements of the 1960s and their origins in the Civil Rights movement. Examines the opposition to government policies and social norms that developed into the Civil Rights, student, New Left, antiwar, countercultural, and women's movements in order to understand their grievances, goals, composition, and impact.

SOC 1170 Race and Ethnic Relations 4 QH

Focuses on racial and religious groups, particularly with reference to the United States. Places special emphasis on historical development, specific problems of adjustment and assimilation, and specific present-day problems and trends. Prereq. SOC 1100 or equiv.

SOC 1171 Race and Ethnic Relations: A World Perspective 4 QH

Offers a cross-cultural analysis of race and ethnic relations in Western and non-Western societies. Examines race and ethnic relations in terms of contemporary developments, world problems, and ideological conflicts.

SOC 1175 Sociology of Work 4 QH

Analyzes dramatic changes occurring in the work lives of Americans and considers the future of American workers within the global economy. Explores emerging labor markets, gender, race, and technology in shaping contemporary American work settings. (VI)

SOC 1176 Sociology of Business/Industry 4 QH

Focuses on the role of industry in modern society. Examines similarities and dissimilarities among industrial societies, bureaucracy and its alternatives, unions, supervision democracy and manipulation, the worker on the assembly line, sabotage of the organization, and the role of wages and alienation.

SOC 1177 Social Roles in the Business World 4 QH

Analyzes the social structure of corporate and business life in contemporary America. Presents and discusses case studies from major accounting and/or industrial firms. Examines the "career line" in the world of business and management, with a special focus on age/sex, racial/ethnic, and class/income barriers.

SOC 1178 Women Working 4 QH

Discusses the fact that differences in the labor force experience of men and women workers generally go unrecognized, and the work experience most common to women—household work—is rarely analyzed. Covers women's market and nonmarket activities, their rewards, and their problems, in addition to empirical and theoretical analyses of the work roles of women. Overall, underscores the differences between work experiences of men and women.

SOC 1180 Sociology of Consumerism and Consumer Behavior 4 QH

Provides students with an opportunity to explore a relevant consumer issue.

SOC 1185 Deviant Behavior and Social Control 4 QH

Explores the conditions under which people categorize others as deviant; processes by which persons so defined are assigned deviant status and assume appropriate roles and self-images; development of deviant careers and their relation to deviant subcultures; situations in which people transform deviant identity.

SOC 1190 Juvenile Delinquency 4 QH

Examines the sociological and psychological approaches to and their implications for a typology of delinquency. Discusses problems of prevention, treatment, and rehabilitation.

SOC 1195 Drugs and Society 4 QH

Offers an introduction to the sociology of drugs. First examines social definitions of drugs, conditions of their use, and socialization into drug use. Then considers deviant drug use and effects of social control on definitions and use. Considers a range of licit and illicit drugs, but gives major emphasis to alcohol, marijuana, and heroin.

SOC 1200 Sociology of Alcoholism 4 QH

Focuses on social responses to deviant alcohol use. Examines drinking cultures and drinking practices in the United States; processes by which people are labeled "alcoholics"; and the role of agencies of social control, such as the criminal justice system and the health care system, in labeling and in rehabilitation.

SOC 1201 Alcohol Use and Social Control 4 QH

Examines how societies define and enforce rules on alcohol use, including the conditions under which controls, informal and formal, come into being, and the consequences of these controls. Examines case studies of Prohibition, liquor control, public drunkenness, alcoholism, legal drinking age, drinking and driving, and drinking in college.

SOC 1202 Sociology of Drinking 4 QH

Examines how different groups and societies organize drinking as a social act and the consequences of that organization. Singles out for particular attention the cultural meaning assigned to drinking, the social elements found in all drinking situations, how members of social groups learn how to drink, and the social and psychological functions of drinking.

SOC 1205 Law, Crime, and Social Justice 4 QH

Analyzes the impact of the legal system on the creation and perpetuation of criminality in contemporary American society. Devotes particular attention to the study of the creation of criminal law, the judicial process, and the role of law in the gap between crime and social justice. Suitable for students in prelaw, criminal justice, political science, and allied fields.

SOC 1206 Class, Crime, and the Police 4 QH

Summarizes the major psychological, social, biological, economic, and political theories about the cause of crime. Applies these theories to the daily operations of the police, courts, and prison system in the United States. Examines white collar crime and the class bias inherent in the more lenient treatment of elite criminals.

SOC 1215 Sociology of Health 4 QH

Examines health and illness in the socio-political context. Focuses on the health professions, the health system, issues of cost, and availability of care. Compares the United States system with those of Western Europe, Eastern Europe, and the Third World. *Prereq.* SOC 1100 or permission of instructor.

SOC 1217 Women, Health, and Social Change 4 QH

Examines how women have traditionally been viewed by the medical field and how reproduction and childbirth came to be defined as medical problems. Also examines the implications for women in the changes that have taken place in health care, especially as these pertain to new reproductive frontiers and alternative health care facilities. Discusses the role of women in the health care professions.

SOC 1225 Aging and Society 4 QH

Surveys issues and questions on aging, with special attention to social and economic consequences of the aging process, including retirement and productivity, health care problems, nursing home residences, widower- and widowhood, and the approach of death. Presents examples relating to aging in other cultures in a search for new answers to social problems of aging in the United States. Gives students the opportunity to learn to anticipate, cope with, and even prevent problems of aging that concern self, family, and clients/patients.

SOC 1235 Death and Dying 4 QH

Focuses on the treatment of death and dying, including problems faced by health care professionals, family members, institutions, the funeral industry, and the dying themselves. Discusses cross-cultural perspectives, the social distribution of mortality, the changing nature of death, and the ethical problems in determining life and death with particular attention to such issues as abortion, suicide, and ceasing medical intervention. *Prereq.* SOC 1100 or permission of instructor.

SOC 1240 Sociology of Human Service Organizations 4 QH

Introduces selected theoretical perspectives on human service organizations, emphasizing defining organizational goals and effectiveness. Gives students the opportunity to become familiar with the nature of human service organizations; to compare these organizations to business and industrial organizations; to outline specific problems that human service organizations face; and to propose potential solutions.

SOC 1245 Sociology of Poverty 4 QH

Analyzes American poverty in historical perspective, drawing on comparisons with other countries. Critically evaluates of sociological research and theories relating to poverty. Considers causes and effects of poverty, as well as societal responses to poverty and its consequences. Suitable for students in applied fields, such as nursing, criminal justice, education, allied health, pre-med, and pre-law.

SOC 1247 Food and Hunger 4 QH

Systematically examines the social causes and consequences of hunger and alternative approaches to solving world hunger.

SOC 1250 The Sociology of Private and Public Assistance 4 QH

Helps students understand why public and private assistance in the United States takes the form it does. Examines the ideology

behind the welfare system, the kinds of assumptions made about the poor, how other countries deal with the problem, the effects of poverty in the United States, and some explanations for its continuing existence.

SOC 1255 Sport in Society 4 QH

Analyzes the social origins and functions of leisure activities, with special emphasis on games and sports as forms of leisure. Gives considerable emphasis to cross-cultural and historical analysis, as well as to the relation between leisure activities and various social institutions—economy, polity, family, and religion. (See SOA 1255.)

SOC 1275 Sociology of the Arts 4 QH

Examines the relation between the social organization of society and the forms of art produced—the social role of the artist, how the arts are “manufactured” and distributed, the art consumer’s relation to art and the artist, social support for the arts. Deals with a variety of art forms, with emphasis on the performing arts.

SOC 1276 Sociology of Popular Culture 4 QH

Presents a sociological analysis of popular culture, focusing on the relationship between pop culture and social institutions such as religion, the law, education, the economy, and the family; the organizations and artistic communities that produce pop culture such as the music industry, theatrical groups, advertising agencies; and the social roles and socialization processes associated with individual artists. Examines changes in popular culture from the viewpoint of changes in the larger society.

SOC 1284 Technology and Careers of the Future 4 QH

Focuses on new technologies and their social impacts on work and careers in the future. Examines sociological and humanistic approaches to technical change in the shop floor, offices, and professions. Also covers issues of design and control, health, employment, and autonomy.

SOC 1285 Technology and Society 4 QH

Discusses the following questions: Does society control technology or is technology directing society? Has technology become dehumanized? How valid is the doctrine of technological inevitability? Can the technological “fix” be viewed as a solution to social problems? Is technology itself a social problem? What can be expected of technology assessment? What of the back-to-nature and antitechnology movements today: are they the waves of the future? Expects students to do considerable independent study and research. (VI)

SOC 1286 Science and Society 4 QH

Examines the profound effects of science on our society, and the ways in which political, economic, and social forces have guided developments in science. Explores issues such as “responsibility” created by this interdependence. Emphasizes the social structures within which science operates and is communicated and science as an occupation and profession, as well as a system of thought and set of tools for producing knowledge. (VI)

SOC 1287 Society Tomorrow: Forecasting Alternative Futures 4 QH

Introduces students to the area of “social futures” or “future studies.” Examines the major techniques used to forecast futures and the specific scenarios and projections about the social world of tomorrow. Considers the major prospects and problems for society in the future.

SOC 1290 Military and American Society in a Nuclear Age 4 QH

Investigates the relationship between the military and society. Covers selected issues, including the impact of the military on social institutions such as the family, polity, and economy, the arms race and upheaval in social life, the post-cold war legitimization crisis of the United States military, the role of women and minorities as reserve armies, and military spending and domestic social problems.

SOC 1300 Classical Social Thought 4 QH

Traces the development of sociology from the history of social thought. *Prereq.* Three sociology/anthropology courses.

SOC 1301 Current Social Thought 4 QH

Reviews the dominant theoretical traditions in contemporary sociology, particularly the pluralist, managerialist, Marxist (or class), and feminist paradigms. Emphasizes Parsonian functionalism; symbolic interactionism; power elite and conflict theory; and neo-Marxist theories of the state, family, economic crisis, imperialism, and global ecological crisis. *Prereq.* Three sociology or anthropology courses.

SOC 1302 Female Perspectives on Society 4 QH

Examines social science and interdisciplinary feminist literature that focuses on women in families and at work, and that deals with physical issues including violence against women and abortion. Incorporates the perspectives of women of color. Considers and evaluates women’s views of social life as well as recognizes the differences among women. (VI)

SOC 1310 Class, Power, and Social Change 4 QH

Focuses on theories of social inequality as applied to the exercise of power and large-scale social change. Examines contemporary events in order to understand power structures. Required of majors. (V) *Prereq.* One sociology course and middler standing or permission of instructor.

SOC 1320 Introduction to Statistical Analysis 4 QH

Examines the application of the principles of measurement, probability, measures of centrality, tests of significance, and techniques of association and correlation to social data. *Prereq.* SOC 1100 or permission of instructor.

SOC 1321 Research Methods 1 4 QH

Introduces students to the research process through an examination of the rules of evidence in empirical research and the place of values. Gives students the opportunity to learn how to design and critique types of sociological research, how to collect qualitative and quantitative data, and how to sample populations. *Prereq.* SOC 1100 and SOC 1320, or permission of instructor.

SOC 1322 Research Methods 2 4 QH

Requires students to complete the research project begun in SOC 1321. Focuses on practice coding, building indexes, scaling, table construction; introduction to use of the computer. *Prereq.* SOC 1100, SOC 1320, and SOC 1321, or permission of instructor.

SOC 1324 Human Services Research and Evaluation 4 QH

Covers basic issues in applied research and the evaluation of services, including the purposes of evaluation, ethics, formulating questions and measuring answers, designing evaluations and planning oriented research, utilizing evaluation results, and the turbulent setting of action programs. Suitable for students

majoring in human services, sociology, psychology, nursing, health education, and related fields. *Prereq.* SOC 1320 or other statistics, SOC 1240, or permission of instructor.

SOC 1335, SOC 1336 Group Behavior 1, 2 4 QH each

Explores how individuals interact in groups and how groups interact with each other. Focuses on the reflexive self, social aspects of language, situational learning, group perspectives, careers, institutions, and worlds.

SOC 1345 American Demographics 4 QH

Offers an applied research experience in which students have the opportunity to study the major areas of demography. Focuses on the resources of the United States Census Bureau and, in particular, the data products available from recent census surveys.

SOC 1347 Community Analysis 4 QH

Explores types of human settlements, focusing on the interaction between people and their political, economic, and social environments. Discusses power structure and citizen action to influence institutions; skills in community analysis, including use of documents, survey, observation, and evaluation of needs and resources; strategies of conflict, cooperation, and negotiation to attain community and group ends.

SOC 1348 Seminar in Urban Studies 4 QH

Compares interdisciplinary approaches to urban studies according to problem areas and research methods. Gives students the opportunity to extend previous term paper projects after exposure to social action and social systemic theoretical perspectives. *Prereq.* SOC 1147 or permission of instructor.

SOC 1355 Politics and Economy in U.S. Society 4 QH

Examines the political economy of United States capitalism. Focuses on the impact of new forms of economic crisis on politics, social classes, labor, and the state.

SOC 1360 Social Class, Status, and Power 4 QH

Focuses on theories of social inequality, concepts of social class, aspects of status and role difference, and criteria for social mobility.

SOC 1365 Collective Behavior 4 QH

Focuses on the rise of new group forms in response to persistent social unrest; masses, crowds, and publics; specific instances of collective behavior such as race riots, wildcat strikes, prison revolts, and campus disorders.

SOC 1375 Sociology of Occupations and Professions 4 QH

Considers occupations and professions as institutions in a broader socio-political context. Includes a historical and international perspective on topics such as training, professional associations, professional services, and the relation of professional groups to capitalism and to states. *Prereq.* Four sociology or anthropology courses or permission of instructor.

SOC 1376 Organization and Bureaucracy 4 QH

Focuses on sociological study of organizations. Examines case studies of private corporations, federal bureaucracies, social service agencies, military-industrial complex, high-risk technological systems, unions. Analyzes recent theories of innovation, participation, and opportunity in complex organizations.

SOC 1385 Social Deviance 2 4 QH

Examines the leading theories of deviance (anomie, subcultural deviance, labeling) and their principal variants; studies their

assumptions, conceptions, propositions, and supportive evidence; analyzes empirical studies in each theoretical tradition.

SOC 1470 Sociology of Religion 4 QH

Offers a comparative and analytic treatment of religion as a social institution, focusing on the relations between religious organizations and other social institutions, with particular emphasis on the American experience. Analyzes religion as an agent of social change and stability. *Prereq.* SOC 1100.

SOC 1475 The Sociology of Mass Communication 4 QH

Focuses on factors in the formation and development of public opinion, the effect of television on children, mass communication as social organization, media-depicted images of society, the role of personal influence, the process of rumor, the use of mass media by the poor, propaganda analysis, and the latent and manifest functions of mass communication.

SOC 1485 Computers and Society 4 QH

Examines the impact of the computer revolution on the conditions of work and life in contemporary society including legal and theoretical issues. Discusses ethical and professional issues in computer use. (VI) *Prereq.* Junior in computer science or mid-dler with ability to program.

SOC 1500 Applied Sociology: Practice and Theory 4 QH

Analyzes the conditions under which sociological knowledge is applied to social problems, the kinds of problems, and the degree of effectiveness of this application. Pays particular attention to research and demonstration projects that derive from sociological theory.

SOC 1501 Social Policy and Social Intervention (Formerly Social Control 2) 4 QH

Focuses on study of the formation of social policies in response to social problems; analyzes policies and problems, supporters and opponents of policy change, conditions under which control agencies adopt new policies, and effects of policy change. Places particular emphasis on case studies of social action and legal change.

SOC 1525 Comparative Human Services 1 6 QH

Offers an intensive look at the American human services system. Gives upper-level undergraduate and graduate students the opportunity to study the origins, development, and present state of human services in the United States. Involves lectures as well as field visits in the Boston area. Provides independent study.

SOC 1526 Comparative Human Services 2 6 QH

Offers an intensive study of the British human services system. Provides students the opportunity to immerse themselves in the social and cultural context of British human services and involves field trips in London designed to examine firsthand the planning, administration, and delivery of human services in Great Britain.

SOC 1535 Seminar in Social Welfare 4 QH

Discusses problems in social welfare observed in the term between "Problems" and "Practicum." Requires a research paper, based on directed fieldwork in the intervening term.

SOC 1601 Seminar in Current Emphases in Sociology 4 QH

Reviews and discusses selected sociological topics. *Prereq.* Junior or senior standing in sociology/anthropology or permission of instructor.

SOC 1700 Introduction to Sociology (Honors)**4 QH**

Honors equivalent of SOC 1100.

SOC 1710 Class, Power, and Social Change (Honors)**4 QH**

Honors equivalent of SOC 1310. Any Honors Program member is eligible to enroll in this course.

SOC 1800, SOC 1801, SOC 1802, SOC 1803 Directed Study**4 QH each**Offers independent work on a chosen topic under the direction of members of the department. Limited to qualified students with approval of department chair. *Prereq.* Junior or senior standing in sociology or permission of instructor.**SOC 1821, SOC 1822, SOC 1823, SOC 1824****4 QH****Junior/Senior Honors Project**

For details contact the honors office.

Theatre**THE 1100 Introduction to Theatre Arts****4 QH**

Focuses on theatre in performance by examining the work of theatre artists (actors, designers, directors, and playwrights). Introduces students to the dynamics of performance and to the reading of play texts, and provides a brief overview of the development of Western theatre. (II)

THE 1106 Theatre History 1—Beginnings to Renaissance**4 QH**

Explores the history of the theatre and its development in the West, focusing on Greece, Rome, Medieval Europe, Golden Age Spain, and Elizabethan and Stuart England. (Can be taken independently of THE 1107.)

THE 1107 Theatre History 2—Renaissance to Naturalism**4 QH**

Focuses on the development of theatre in the Italian Renaissance; the spread of Italianate forms throughout Europe during the seventeenth and eighteenth centuries; the rise of Romanticism in Germany and its spread; and the rise of realism and naturalism in France, Scandinavia, and throughout Europe. (Can be taken independently of THE 1106.)

THE 1111 American Musical Theatre**4 QH**Traces the development of the American musical from *The Black Crook* to the present. Considers the role of musical theatre as both entertainment and serious art form through an examination of script, score, dance, and design. Includes works by composers and lyricists such as Rodgers and Hammerstein, Lerner and Loewe, Cole Porter, Bock and Harnick, Leonard Bernstein, and Stephen Sondheim.**THE 1112 Dramatic Theory and Criticism****4 QH**

Examines and explores the major historical writings in dramatic and theatrical performance theory. Considers how dramatic theory is reflected in dramatic texts and production from Aristotle to the present.

THE 1114 Masters of the Theatre**4 QH**

Overviews several great practitioners of theatre. In particular, stresses how society influenced the thought and craft of playwrights, actors, directors, designers, and theorists. Pays careful attention to how the play's ideas are translated into performance. Uses video, discussion, and live performance, when possible, as integral elements in the course. (III)

THE 1116 The American Theatre**4 QH**

Focuses on the American theatre from the Revolutionary War to the present.

THE 1118 Black Theatre in America**4 QH**Surveys the history of black theatre artists in America from the time of Ira Aldridge to the present day. Also examines the works of black playwrights from the Harlem renaissance to the present, with an emphasis on the period beginning with Baraka's *Dutchman*.**THE 1121 Contemporary Theatre****4 QH**

Examines the current state of commercial, regional, and other noncommercial theatre in the United States, using readings, lectures, reports, and weekly visits to theatre productions in the area. Explores through lectures the background of these types of theatre in twentieth century American and European theatre.

THE 1127 The Comic Theatre**4 QH**

Surveys theatrical comedy from the ancient Greeks to the present. Examines the comic playwright, the "joke writer," the comic director, the comedic actor, and the standup comedian. Discusses theories and techniques of laughter, as well as the psychological and sociological benefits derived from laughter. Includes reading playscripts by Aristophanes, Molière, Shakespeare, Shaw, and Simon as well as viewing and listening to tapes of Chaplin, the Marx Brothers, and others. Examines comedy devices through lectures, films, records, and attending live performances.

THE 1140 Playwriting 1**4 QH**

Emphasizes the principles and practices of modern dramatic composition: characterization, plot, plot structure, dialogue, and other dramaturgical elements as seen in the one-act play. Includes the writing of brief scenes, the dramatic composition, and the one-act play.

THE 1149 Script Analysis for the Stage**4 QH**Aids the theatre practitioner in developing the skills necessary for analyzing scripts in preparation for production. Focuses on dramatic theory and structure and theatrical techniques that will enable an actor, director, designer, or playwright to uncover the problems of translating theory into practice. *Prereq.* Theatre major or minor.**THE 1150 Introduction to Acting****4 QH**

Focuses on fundamental techniques of stage use, the actor and the stage environment, and improvisations for strengthening imagination and increasing freedom.

THE 1155 Voice for the Theatre**4 QH**

Focuses on vocal exercises that enable the actor to better connect with the voice through freeing the physical and emotional self. Emphasizes centering, physicalization, breath support, articulation, resonance, projection, and relaxation. Includes selected monologues and/or scenes for classroom analysis.

THE 1160 Movement 1**4 QH**Emphasizes using the body as an expressive instrument for Realism. Develops concentration, control, and stamina through exercise, relaxation, improvisation, manipulation of energy flow, rhythms, and imagination. *Prereq.* Theatre major or permission of instructor.

THE 1180 Concepts of Direction**4 QH**

Focuses on purposes and techniques of theatrical direction related to script analysis, production style, pictorial composition, rhythmic evolution, and empathic responses. *Prereq.* THE 1150 and THE 1212.

THE 1200 Stagecraft**4 QH**

Focuses on principles that underlie the coordination and execution of technical production. Examines different kinds of scenery, tools, equipment, and construction materials. Lab work involves preparing technical elements of University productions. *Prereq.* Theatre major or permission of instructor.

THE 1209 Theatrical Drafting**4 QH**

Through work on supervised classroom projects, exposes the student to the basic graphics language needed to translate a designer's ideas into technical drawings used for construction. *Prereq.* THE 1200.

THE 1210 Scenic Design for the Stage**4 QH**

Introduces the theory and practice of theatrical design and the role of the designer in the production process. Through project work, examines the use of the graphics tools—line, form, balance, color, rhythm, etcetera—in the development of the design idea. Emphasizes understanding and utilizing spatial relationships, visually expressing conceptual themes, and understanding the various uses, problems, and practical considerations of proscenium, thrust, and arena staging. Analyzes historical production styles from the Greco-Roman period through the nineteenth century. *Prereq.* THE 1200, THE 1212, or permission of instructor.

THE 1212 Introduction to Theatrical Design**4 QH**

Introduces the visual effects of modern theatrical production and the creative processes by which these come into being, through a basic survey of the three major design disciplines, their supporting technology, and their working interrelationship. Addresses the questions of how artistic concepts are developed and related, how they are communicated to other artists and an audience, and how one develops the critical processes necessary to evaluate these concepts.

THE 1213 Scene Design 2: Principles**4 QH**

Focuses on the development and expression of conceptual statements from specific dramatic texts through a series of exercises involving script analysis and introductory work in rendering and model construction. Examines texts selected from works of distinct historical and stylistic periods. Studies the heritage of twentieth-century theatrical design through the work of artists such as Appia, Craig, Jones, Urban, and Oenslager. Emphasizes the development of such stylistic treatments as realism, expressionism, symbolism, and constructivist and environmental design. *Prereq.* THE 1210.

THE 1225 Scene Painting**4 QH**

Traces the history of scene painting and ornament from classical to contemporary times. Focuses on studio organization, color, color theory, equipment, tools, materials, and costs involved with painting stage scenery. Uses projects and exercises in the use of different media, matching colors, painting of textures, light and shade, and the use of stencils and physical textures. Includes lab sessions involving painting stage scenery for University productions. *Prereq.* THE 1200 or permission of instructor.

THE 1226 Lighting Design for the Stage**4 QH**

Examines basic principles and practices of stage lighting, including the qualities and functions of light, lighting instruments and controls, basic electricity, color in light, and analysis of the script in terms of light requirements. Expects students to develop light plots and schedules for various kinds of stage productions. Includes lab work on lighting crews for University productions. *Prereq.* THE 1200, THE 1212, or permission of instructor.

THE 1261 Costuming I**4 QH**

Presents the beginning designer with the opportunity to investigate costume design theory and to foster perceptual development. Through lectures and projects, gives students the opportunity to explore both the abstract and historical aspects of costume design as well as textual analysis and its conceptual implications. (Does not require prior art or design education.)

THE 1265 Pattern Drafting and Costume Construction**4 QH**

Develops the skills and techniques necessary for the patterning, cutting, and construction of costumes for the stage. Covers flat pattern drafting, draping, and finishing techniques.

THE 1280 Stage Makeup**4 QH**

Focuses on the principles of, the reasons for, and the materials used in makeup for the theatre, television, and films. Includes the practical application of types and styles of makeup—straight, old-age, character, and corrective. *Prereq.* Theatre major or permission of instructor.

THE 1284 Theatre Management**4 QH**

Focuses on problems of financing, promoting, and programming for profit and nonprofit professional theatre.

THE 1292 Children's Theatre**4 QH**

Focuses on theories and methods of creative techniques related to children's programs in schools, churches, and recreational facilities. Analyzes literature in preparation for production of children's plays.

THE 1300 Acting 2**4 QH**

Focuses on developing the actor's sense of truth and emotional freedom. Emphasizes creating, developing, and sustaining character and developing ensemble. Includes monologues and scenes performed for classroom analysis. *Prereq.* THE 1150 and permission of department chair.

THE 1301 Acting 3**4 QH**

Focuses on further development of the actor's tools, script and character scoring, and exercises for physical and psychological freedom. Includes in-class scenes from works in progress. *Prereq.* THE 1300 and permission of instructor.

THE 1302 Acting 4**4 QH**

Deals with scene work from a spectrum of theatrical genre. Focuses on developing a technique for approaching a role through research, character, and language. *Prereq.* THE 1301 and permission of instructor.

THE 1316 Acting for the Camera (Television)**4 QH**

Presents the fundamentals of camera acting, adjusting the actor's physical responses to the mechanical eye of the camera and the delicate ear of the microphone. Involves studio work before the television camera to explore the genres of dramatic, commercial, and industrial acting. *Prereq.* THE 1150, THE 1155, THE 1160, THE 1300, THE 1301, and THE 1302.

THE 1325 Musical Theatre Technique 4 QH Applies acting technique to the performance of musical material. Explores song through text and character progression, develops a process for approaching a song, and synthesizes movement, gesture, and emotion with melody, rhythm, and lyrics. Involves student performances of solo, small ensemble, and large ensemble material. Does not involve singing technique. <i>Prereq. THE 1150, THE 1300, and permission of instructor.</i>	THE 1810, THE 1811, THE 1812, THE 1813 4 QH each Junior/Senior Honors Project For details contact the honors office.
THE 1370 Rehearsal and Performance 4 QH Allows students to participate in public performance through preparation and rehearsals in areas of acting, directing, design, and stagemanaging. <i>Prereq. Permission of instructor.</i>	THE 1820, THE 1821, THE 1822, THE 1823 Directed Study 4 QH each
THE 1400 Costuming 2 4 QH Offers advanced study in textual interpretation and its application to costume design. Emphasizes conceptual and stylistic development through assigned projects in the various genres of the performing arts. <i>Prereq. THE 1261 or permission of instructor.</i>	THE 1840, THE 1841, THE 1842, THE 1843, THE 1844, THE 1845, THE 1846, THE 1847, THE 1848, THE 1849 4 QH each Special Topics in Theatre Performance Offers opportunity for in-depth examination of a subject of particular significance to the field.
THE 1410 Technical Production 4 QH Allows the opportunity to acquire and explore the requisite skills for developing working drawings and budgetary analyses for theatrical productions. Focuses on several projects and includes the opportunity to coordinate one substantial production. Requires that the specialized study be executed in close supervision with the instructor. <i>Prereq. All courses in production/design concentration and permission of instructor.</i>	THE 1860, THE 1861, THE 1862, THE 1863, THE 1864, THE 1865, THE 1866, THE 1867 Special Topics in Theatrical Design 4 QH each Offers opportunity for in-depth examination of a subject of particular significance to the field.
THE 1420 Advanced Drafting and Construction 4 QH Offers specialized study in technical production techniques. Covers drafting procedures necessary for the conversion of designer's drawings into detailed rear elevation and construction layouts, as well as the development of section, isometric, and oblique views. Through a series of practical and project exercises, analyzes the various factors governing the construction and rigging of two- and three-dimensional scenery, linear-motion, rotary-motion, and elevating systems. Emphasizes theatrical problem solving with regard to safety, dependability, and economy. Lab fee. <i>Prereq. THE 1209.</i>	THE 1890, THE 1891, THE 1892, THE 1893 4 QH each Special Topics in Theatre History/Dramatic Criticism Offers opportunity for in-depth examination of a subject of particular significance to the field.
THE 1430 Lighting Design 2 4 QH Offers an intensive study of lighting design theory and practice. Expects students to design numerous lighting plots, sections, instrument schedules, and design concepts for various types of productions and spaces. Investigates and discusses current professional techniques and practices. <i>Prereq. THE 1226.</i>	
THE 1505 Continental Drama 4 QH Covers seminal late nineteenth- and mid-twentieth-century continental drama. Focuses on playwrights whose plays had a major impact on modern drama and theatre.	
THE 1510 Twentieth Century Theatre 4 QH Studies the history of the post-naturalistic theatre in Europe and the United States. Explores the work and influence of such figures as Craig, Appia, Meyerhold, Brecht, Artaud, Grotowski, Beck and Molina, Schechner, and Chaiken.	
THE 1800, THE 1801, THE 1802, THE 1803 Practicum in Production 1 QH each Offers lab practice in technical production; can be repeated for credit (maximum four credits). <i>Prereq. Departmental permission.</i>	

Business Administration

Accounting

ACC 1111 Accounting Principles 1

4 QH

This first of a series of accounting courses assumes students do not possess knowledge of the subject. Both this course and ACC 1112 are designed to help provide an understanding of accounting issues and objectives for proper interpretation and analysis of financial accounting information. Specific topics covered in this first course are the nature, function, and environment of accounting; the basic accounting model; financial and analytical ratios; the evaluation of accounts receivable; the control of inventory; the acquisition, disposal, and depreciation of plant and equipment; short- and long-term debt financing; and corporate stockholder equity. *Prereq.* *Sophomore standing.*

ACC 1112 Accounting Principles 2

4 QH

In this second of a series of courses, students are introduced to managerial accounting decisions through class discussions, exercises, and demonstration problems. Specific topics covered include the statement of case flows; ratio analysis; cost behavior; breakeven analysis; cost-volume-profit analysis; absorption versus variable costing; relevant cost analysis; and capital budgeting. *Prereq.* *ACC 1111 and sophomore standing.*

ACC 1331 Intermediate Accounting 1

4 QH

Constitutes the principal foundation course for accountants; includes a comprehensive review of the conceptual framework of accounting. Emphasizes the preparation of financial statements and their use in decision making. Stresses the development of accounting theory in the analysis of alternative accounting treatments and procedures. Pays particular attention to cash, accounts receivable, and inventories. *Prereq.* *ACC 1111 or equiv. and middler standing.*

ACC 1332 Intermediate Accounting 2

4 QH

Continues the study of accounting principles, concepts, and procedures introduced in ACC 1331. Emphasizes the conceptual aspects of measuring and reporting liabilities and alternative accounting treatments and procedures. *Prereq.* *ACC 1331 and middler standing.*

ACC 1339 Cost Accounting

4 QH

Develops understanding of the critical role of cost measurement in business decisions and in managing a firm's profitability. Studies alternate ways of measuring costs to meet different management objectives, the role of budgeting as a planning and management tool, and the use of cost analysis as a control tool to help management meet short- and long-term profit objectives. *Prereq.* *ACC 1112 and middler standing.*

ACC 1343 Intermediate Accounting 3

4 QH

Completes the intensive study of measurement and reporting issues of modern accounting practice. Emphasizes the conceptual and procedural aspects associated with the reporting of stockholders equity, earning per share, and deferred taxes. *Prereq.* *ACC 1332 or permission of instructor.*

ACC 1345 Accounting Systems

4 QH

Examines the process of analyzing and designing financial accounting systems. Uses a conceptual approach and cases to consider the appropriate use of computer technology in designing

new systems. Covers system analysis and design concepts, files and database design, and how to control specific accounting applications. *Prereq.* *ACC 1331, introductory computer course, or permission of instructor, and middler standing.*

ACC 1347 Auditing

4 QH

Examines audit concepts, standards, and procedures, including the auditor's legal and ethical responsibilities, the auditing profession, auditing standards, code of professional conduct, auditor's reports, evidence, internal control structure, statistical sampling, legal liability, and substantive testing. *Prereq.* *ACC 1332 or ACC 1343.*

ACC 1351 Federal Income Taxes 1

4 QH

Emphasizes basic understanding of the federal income tax structure relating to individuals rather than corporations. Requires completion of several tax return problems and research cases directed at solving various tax problems. Through case studies, introduces the current Internal Revenue Code, income tax regulations, and cumulative bulletins. Emphasizes tax planning. *Prereq.* *ACC 1331.*

ACC 1512 Federal Income Taxes 2

4 QH

Continues ACC 1351. Topics include taxpayers other than individuals and the treatment of property transfers that are subject to federal, gift, estate, and trust taxes. Tax return problems are an important element of this course. A major emphasis is given to tax planning considerations, especially to gift and death tax consequences. *Prereq.* *ACC 1351.*

ACC 1521 Advanced Accounting

4 QH

Analyzes accounting theory and practice in various areas for the student planning a career as a professional accountant. Includes accounting for partnerships and branches; business combinations and consolidated financial bankruptcy; liquidation and reorganization; accounting for multinational enterprises; segments, interim reporting, and reporting to the SEC; and ethical issues in advanced accounting. *Prereq.* *ACC 1343 or permission of instructor.*

ACC 1522 Advanced Accounting for Business Combinations

4 QH

Provides a comprehensive analysis of the accounting theory and practice associated with corporate acquisitions and combinations. Topics include methods of consolidation-elimination of profits on intercompany transactions, purchase versus pooling of interests, and accounting for good will. The course is intended for the serious student preparing for a career as a professional accountant. *Prereq.* *ACC 1343 or permission of instructor.*

ACC 1548 Accounting Theory and Practice

4 QH

Examines the theory, practice, and trends associated with corporate financial reporting. Includes the conceptual framework of accounting and reporting, the developmental process and hierarchy of generally accepted accounting principles, and the analysis and interpretation of corporate financial statements. Intended for students preparing for careers as professional accountants. *Prereq.* *ACC 1343 or permission of instructor.*

ACC 1591 Independent Study

1 QH

This course is for the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval.

Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

ACC 1592 Independent Study**2 QH**

Same as ACC 1591.

ACC 1593 Independent Study**3 QH**

Same as ACC 1591.

ACC 1594, ACC 1595, ACC 1596, ACC 1597 Independent Study**4 QH**

Same as ACC 1591.

ACC 1711 Accounting Principles 1 (Honors)**4 QH**

See course description for ACC 1111.

ACC 1712 Accounting Principles 2 (Honors)**4 QH**

See course description for ACC 1112.

ACC 1891 Honors Thesis in Progress**0 QH****ACC 1892 Honors Thesis****8 QH****ACC 1893 Honors Thesis in Progress****0 QH****ACC 1894 Honors Thesis****12 QH**

Entrepreneurship

ENT 1330 Entrepreneurship**4 QH**

Introduces entrepreneurship, focusing on the following questions: What is entrepreneurship and how do you become an entrepreneur? How do you find or create ideas that might become businesses? How can you determine if the ideas have merit in the marketplace? How do you start a firm that, from the beginning, is market oriented and focused on what customers need and are willing to buy? Gives students an opportunity to conduct detailed evaluations of new business ideas.

ENT 1344 Starting and Managing a New Business**4 QH**

Identifies the key principles and practices needed to start a business from the initial idea to the management of profits and further expansion. Covers such topics as alternative approaches to business entry, initial team building, managing interactions with initial customers, establishing control systems, legal matters, and building necessary external relationships. Gives students an opportunity to analyze a new venture.

ENT 1352 Planning and Growing New Ventures**4 QH**

Focuses on how entrepreneurs turn small businesses into larger businesses. Includes planning, forecasting sales, increasing production, designing new products or services, designing distribution and managing a sales force, managing personnel, using strategic linkages with other companies to increase market presence, and working with a growing customer base. Discusses how to manage a small firm in hard financial times. Offers students an opportunity to develop comprehensive business plans for new or existing businesses as term projects.

ENT 1358 Small Business Institute**8 QH**

Sponsored by the United States Small Business Administration (SBA), the course provides students with an opportunity to apply their business training through an analytical, problem-solving technique learned in the classroom. Expects student teams to interact with owners and managers of local small businesses to analyze problems and opportunities and develop recommendations, and to devote the equivalent of two days per week to collecting information. Combines experience with occasional class meetings and frequent team meetings with a faculty member. Requires students to present interim progress reports and final written and oral reports to the client company and the SBA. *Prereq. Junior standing or permission of instructor.*

ENT 1591 Independent Study**1 QH**

This course is for the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

ENT 1592 Independent Study**2 QH**

Same as ENT 1591.

ENT 1593 Independent Study**3 QH**

Same as ENT 1591.

ENT 1594, ENT 1595, ENT 1596, ENT 1597 Independent Study**4 QH**

Same as ENT 1591.

ENT 1598 Independent Study**8 QH**

Same as ENT 1591.

ENT 1891 Honors Thesis in Progress**0 QH****ENT 1892 Honors Thesis****8 QH****ENT 1893 Honors Thesis in Progress****0 QH****ENT 1894 Honors Thesis****12 QH**

Finance and Insurance

FIN 1201 Personal Finance**4 QH**

Focuses on management of the total personal estate: budgeting, savings, insurance, investments, borrowing, taxes, Social Security, pensions, annuities, securities markets, mutual funds, and their integration. *Not open to College of Business Administration students.*

FIN 1333 Financial Institutions and Markets**4 QH**

Explores the financial environment faced by a firm as well as the financial institutions serving the economy. Discusses the forces that determine the changes in money and capital markets and explores the implications of changing financial environment for the management of funds in a firm and/or financial institution. *Prereq. ACC 1112 and middler standing.*

FIN 1335 Managerial Finance**4 QH**

The objective of the course is to provide students the opportunity to gain knowledge of the advanced tools and concepts used in the management of funds. Topics include inventory and credit policies, risk, capital budgeting, financial structure, cost of capital, dividend policy, and valuation of a firm. Overall financial strategy and timing of its implementation are also examined. Specialized topics—mergers and acquisitions, financial failure, and financial policy for multinational firms—may be considered in the course. *Prereq. FIN 1439.*

FIN 1346 Investment Management**4 QH**

Presents a broad overview of the concepts, practices, and procedures of investment management. Covers basic security types, security market operations, security analysis (both fundamental and technical), and an introduction to portfolio management. *Prereq. FIN 1439.*

FIN 1438 Principles of Finance 1**4 QH**

Familiarizes students with the concepts, tools, practices, and procedures in financial management. Covers valuation, financial analysis and planning, risk management, and capital budget. Uses problems, case discussions, and spreadsheet analysis to enhance student understanding of financial concepts. *Prereq. ACC 1111, MSC 1200, and middler standing.*

FIN 1439 Principles of Finance 2**4 QH**

Continues FIN 1438. Covers working capital planning and management, issues in capital structure and long-term financing, international finance, and special topics. Emphasizes understanding financial concepts and applying them to real world problems. Uses problems, case discussions, and spreadsheet analysis to enhance student understanding of financial concepts. *Prereq. ACC 1112, MSC 1201, and middler standing.*

FIN 1503 Taxes and Financial Decisions**4 QH**

In this course, the case method is used to discuss a number of financial decisions that are greatly influenced by tax considerations, the most important of which are concerned with capital structure, dividend policy, acquisition terms, investment policies and liquidations. The federal income tax receives primary consideration, but state and foreign taxes are also discussed. *Prereq. FIN 1439 and middler standing.*

FIN 1520 Options and Futures Markets**4 QH**

Explores the relatively new concepts of financial futures, options on financial futures, and listed options markets as developed to help corporations and financial institutions manage interest-rate risk. Topics include mechanics of these markets, techniques that can hedge interest rate exposure, tracing methods, and current developments in the field. *Prereq. FIN 1346.*

FIN 1526 Securities Markets**4 QH**

Analyzes the operation of the securities market. Provides students the opportunity to examine in detail the operation and function of investment bankers, broker-dealers, and securities exchanges. Studies the mechanics of cash and margin accounts, trading options, and regulations affecting securities markets. *Prereq. FIN 1439.*

FIN 1530 Working Capital Management**4 QH**

Examines strategies and analytical approaches to managing current assets and current liabilities. Explores corporate cash management under changing money market conditions. Discusses the

use of interest rate futures and working capital management in a multinational context. *Prereq. FIN 1439.*

FIN 1531 Capital Investment Decision Analysis**4 QH**

Analyzes capital budgeting techniques and portfolio considerations, including risk analysis, capital structure and valuation, and other long-term corporate finance topics. *Prereq. FIN 1439.*

FIN 1538 Financial Ethics**4 QH**

Investigates and helps develop a systematic understanding of ethical dilemmas of financial business decision making. Examines the influence of business cultures on personal behavior, combining wisdom of the past with current ethical thinking and each individual's standards. *Prereq. FIN 1438.*

FIN 1540 Management of Financial Institutions**4 QH**

Studies the decision-making problems faced by financial institutions such as commercial banks, savings and investment institutions, and finance companies when viewed as competitive, profit-seeking business entities. Covers such topics as the nature and scope of the capital markets confronting institutions, specialized problems regarding the sources and uses of funds of financial institutions, the nature of competition, the regulation of financial institutions, and strategic policy planning of financial institutions. *Prereq. FIN 1439 or FIN 1333.*

FIN 1543 Modern Portfolio Management**4 QH**

Analyzes the methods of selection, revision, and performance measurement of asset portfolios. Exposes the students to the current methods of building an asset portfolio. Presents and evaluates the concept of the efficient frontier of assets in the risk-return space. Includes a simulated equity fund-management project, in which students select equity securities and then prepare and present annual reports evaluating their portfolios' construction and performance. *Prereq. FIN 1346.*

FIN 1544 Bank Management**4 QH**

Examines the financial management of commercial banks and thrift institutions. Analyzes the problems of liquidity and investment management, loan portfolio and capital management, and pricing problems associated with various sources and uses of funds in the context of changing economic and regulatory environment for these institutions. Presents lectures, discussions, and cases. *Prereq. FIN 1439 or FIN 1333.*

FIN 1545 Investment Banking**4 QH**

Focuses on the managerial functions of investment banking firms. Examines individual investors and institutions in the money and capital markets from the viewpoint of investment banking firms. Familiarizes students with the operating and cash flow characteristics of institutional and individual clients. *Prereq. FIN 1439.*

FIN 1549 Principles of Real Estate**4 QH**

Surveys the field of real estate, including principles of real estate law, valuation, brokerage, finance, land use, and negotiations. Gives the student the opportunity to become a better decision maker and to prepare for future studies in real estate. *Prereq. FIN 1439.*

FIN 1550 Real Estate Finance: Analysis and Investment**4 QH**

Presents real estate financing techniques, sources of funds, and investment property analyses. Examines the legal and financial aspects of such techniques as mortgage liens, leaseholds, contracts for deed, and sale-leasebacks, as well as the primary and

secondary mortgage markets. Surveys methods of valuing income properties. *Prereq.* FIN 1549.

FIN 1562 Employee Benefits Management 4 QH
Covers the design, implementation, and financing of corporate employee benefit plans. Presents a comprehensive analysis of qualified and non-qualified benefit and executive compensation plans. Emphasizes the proper management, design, and financing of these plans to achieve corporate goals at minimum feasible cost. Studies alternative methods of financing benefit and executive compensation plans. Includes recent developments in Social Security, benefits, and tax legislation. *Prereq.* FIN 1439.

FIN 1566 Risk Management and Insurance 4 QH
Emphasizes the functional area of corporate risk management. Covers such areas as organizing and controlling the risk management function; identifying, measuring, controlling, and financing risk; selecting the best method of risk treatment; and implementing and monitoring risk management. Topics of exposure analysis include property, liability (public, employer, products, officers and directors, and professionals), income, and extraordinary expense losses. Covers treatment methods such as self-insurance, off-shore captive, retention groups, and commercial insurance. Includes recent developments such as tort reform integration of risk management with modern financial theory, as well as implications and analysis of recent tax reforms. *Prereq.* FIN 1439.

FIN 1580 Personal Financial Management 4 QH
Emphasizes the development of personal financial management expertise, based on an integrated plan for personal choices. Focuses on an overall personal economic plan and unites such diverse topics as inflation and investment selection, insurance, short- and long-run hedges against the purchasing power risk, and purchasing assets. Encourages decision making through analyzing alternative courses of action. *Prereq.* FIN 1438.

FIN 1582 Personal Insurance Planning 4 QH
Focuses on the informed decisions necessary to establish a comprehensive, rational plan of personal insurance. Examines through class discussion, lectures, and readings the various kinds of personal insurance and how to create an insurance package for clients with different insurance needs. *Prereq.* FIN 1438.

FIN 1591 Independent Study 1 QH
This course is for the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

FIN 1592 Independent Study 2 QH
Same as FIN 1591.

FIN 1593 Independent Study 3 QH
Same as FIN 1591.

FIN 1594, FIN 1595, FIN 1596, FIN 1597 Independent Study 4 QH each
Same as FIN 1591.

FIN 1738 Principles of Finance 1 (Honors) 4 QH
Acquaints students with basic processes, principles, tools, and concepts of finance. Topics include financial analysis, financial forecasting, profit planning, budgeting, working capital management, and capital budgeting. Covers the basics of financial markets, institutions, and sources of supply of different types of funds available to a firm. *Prereq.* ACC 1112, MSC 1201, and *middler standing*.

FIN 1739 Principles of Finance 2 (Honors) 4 QH
Continues FIN 1738. Builds upon the basic set of analytical tools and stresses application. Covers advanced capital budgeting, cost of capital, and long-term financing. Examines the implications of a firm's choice of capital structure and dividend policies. *Prereq.* FIN 1438 or FIN 1738.

FIN 1759 International Financial Markets 4 QH
Introduces international financial markets, including balance of payments, history of the international monetary system, exchange-rate determination, foreign-exchange-exposure hedging strategies, and international capital markets. Emphasizes how international financial markets work and how corporations must adapt their decision-making to the international environment. *Prereq.* FIN 1439.

FIN 1760 International Financial Management 4 QH
Examines how the financial strategies and policies of multinational corporations differ from domestic corporations and how financial management is utilized in an international setting to achieve corporate goals. Specific topics include cost of capital, capital budgeting, capitalization policies, and management techniques for dealing with exchange-rate exposure and working-capital issues. Knowledge of exchange rates is assumed. *Prereq.* FIN 1759.

FIN 1770 Small-Business Finance 4 QH
Uses basic processes, principles, tools, and concepts of finance within the parameters of a small business to develop a complete financial plan that projects the future circular flow of funds by analyzing and then integrating the impact of both investment decisions (use of funds) and financial decisions (source of funds). *Prereq.* FIN 1439.

FIN 1814 Financial Forecasting 4 QH
Discusses how accurate forecasts of product demand, retail sales, and cash-flow levels are critically important for companies regardless of size. Covers how effective financial forecasting integrates macroeconomic factors, particularly the business cycle, and institutional factors with appropriate quantitative methods. Addresses both issues—economic or business cycles and forecasting techniques—in sufficient depth so that students can obtain the skills necessary to build and interpret a basic forecasting model for business. *Prereq.* Honors participation or permission of instructor.

FIN 1816 Economic Decision Making in the Global Environment (Honors) 4 QH
Simulates global competition to enable students to develop and execute a strategy to propel their company to the top ranks in the US, Europe, and Asia. Considers such issues as new product development, selection of product attributes, calculation of demand, least-cost financing of investments, fluctuating foreign exchange rates, cost-minimizing versus product differentiation strategies, and aggressive versus defensive posturing. Emphasizes “winning” the competitive battle in terms of key economic

variables while attempting to satisfy stakeholders and avoid interference by government antitrust authorities. *Prereq. Honors participation or permission of instructor.*

FIN 1818 Turnaround Management (Honors) 4 QH

Examines strategies for identifying companies likely to fail and selecting and implementing remedial actions. Covers such topics as business turnarounds, troubled companies, workouts, bankruptcies, and liquidations, using case studies and readings. Students will evaluate a turnaround plan. *Prereq. Honors participation or permission of instructor.*

FIN 1891 Honors Thesis in Progress 0 QH

FIN 1892 Honors Thesis 8 QH

FIN 1893 Honors Thesis in Progress 0 QH

FIN 1894 Honors Thesis 12 QH

Human Resources Management

HRM 1332 Introduction to Human Resources Management 4 QH

Helps students develop understanding of contemporary issues in human resource management. Examines problems posed by changing work patterns, labor force characteristics, union activities, and government policies. Discusses and evaluates organizational experiments such as worker participation, job enlargement, and group incentives from a managerial perspective. *Prereq. Middler standing.*

HRM 1345 Contemporary Labor Issues 4 QH

Studies current issues dealing with labor in its broadest sense. Discusses and evaluates labor unions and manpower institutions as well as the emerging development and training problems motivated by unemployment, poverty, and changing work patterns. Reviews recent legislation dealing with the employment relationship. *Prereq. Middler standing.*

HRM 1348 Reward Systems: Wage, Salary, and Benefits Administration 4 QH

Examines one of the major functions of personnel administration—compensation management—and its part in the overall personnel programs of the organization. Develops through simulation exercises, group projects, lectures, and cases an analysis of reward systems as supportive mechanisms of management and the formulation of compensation policy and implementation of compensation systems. *Prereq. Middler standing.*

HRM 1349 Selection and Assessment of Employees 4 QH

Examines three influences of employee selection and testing: the legal aspect of selection, where the greatest uncertainty is found; the influence of industrial psychology on selection and decision-making techniques; and the area of personnel practices itself, that is, the methods employers find effective in coping with legal requirements. Covers basic issues and procedures such as EEO, decision strategies, and the utility and evaluation of selection and appraisal systems. *Prereq. Middler standing.*

HRM 1431 Complex Organizations 4 QH

Examines the structure and dynamics of the complex organization. Focuses on the design of the organization and its basic sub-

systems (reward, control, selection, development). Explores how organizational structures help shape human behavior.

Emphasizes understanding the interrelations among organizational structures, tasks, and individual characteristics within the context of a changing environment. *Prereq. Middler standing.*

HRM 1432 Organizational Behavior 4 QH

Explores the effects of individual, interpersonal, group, and leadership factors on human behavior. Also explores managerial applications of behavioral and social science concepts, including job design, job satisfaction, performance appraisal, supervision, career dynamics, and organizational change. Emphasizes helping the student develop skills in dealing with the human side of enterprise. *Prereq. Middler standing.*

HRM 1433 Organizational Behavior and Design 8 QH

Covers the material from HRM 1431 and HRM 1432. The structure and dynamics of the complex organization are examined, focusing on the design of the organization and its basic subsystems. The effects of individual, interpersonal, group, and leadership factors on human behavior are also examined. Students have the opportunity to explore how organizational structures help shape human behavior and to develop skills in dealing with the human side of enterprise. *Prereq. Middler standing.*

HRM 1508 Participative Management 4 QH

Examines participative management, a range of techniques that may enhance employee involvement in decision making. Studies the motivational basis for participative programs, describes the forms and techniques available, and examines criteria for evaluating effectiveness. Considers internal and external organizational factors that may affect overall success of participation and discusses cultural and social aspects of participative management in an international business environment. *Prereq. Middler standing.*

HRM 1517 Managing Power and Influence 4 QH

Examines the effective use of power and political processes in organizations. Considers the philosophical and social psychological foundations of social influence strategies and tactics, and develops clinical skills for seeing, recognizing, and utilizing these strategies and tactics in ways that are organizationally effective and socially responsible. Presents information with the expectation that familiarity and sensitivity to the dynamics surrounding the use of power and influence will provide both insulation and awareness for students as they deal with these issues in their managerial careers.

HRM 1519 Leadership 4 QH

Studies the leadership function in a variety of organizational settings. Uses a contingency approach to help students explore a range of possible leadership behaviors, relating the appropriateness of a particular style to a number of situational factors. Readings provide an opportunity to explore several contingency theories of leadership; cases allow for the application of these models; and videotaped role playing and self-assessment techniques permit students to evaluate their own leadership style. *Prereq. Middler standing.*

HRM 1539 Managing Careers 4 QH

Surveys the tools for both self-assessment (investigating one's skills, abilities, needs, values, and interests) and career exploration (determining the nature of and requirements for entering and succeeding in various career fields). Helps students develop

an individualized plan of action that summarizes a wide variety of data indicating an individual's present status and career goals and the means by which to bridge the gap. *Prereq. Middler standing.*

HRM 1581 Managerial Skills Seminar 4 QH

Studies and develops specific behavioral and interpersonal skills critical for managerial success, particularly those most vital early in management careers, in a seminar/workshop format. Uses introspective and experiential exercises and role plays extensively and discusses specific work assignments. *Prereq. Middler standing.*

HRM 1585 Managing Human Resources: The Legal Environment 4 QH

Studies the recent legal developments affecting the management of human resources. Examines recent state and federal laws that will influence managerial policies and practices in areas such as employment testing, hiring and promotion, controlling unemployment compensation and Worker's Compensation claims, and responding to OSHA and ERISA regulations. *Prereq. Middler standing.*

HRM 1591 Independent Study 1 QH

This course is for the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

HRM 1592 Independent Study 2 QH

Same as HRM 1591.

HRM 1593 Independent Study 3 QH

Same as HRM 1591.

HRM 1594, HRM 1595, HRM 1596, HRM 1597 4 QH each

Independent Study

Same as HRM 1591.

HRM 1760 International Labor Relations Systems 4 QH

Analyzes labor relations systems of selected countries in comparison with that of the United States. Also studies the political, cultural, and economic forces that shaped these systems. Gives special attention to such international institutions as multinational companies and the EEC. Cases, readings, and projects assigned. *Prereq. Middler standing.*

HRM 1762 Managing People in International Settings 4 QH

Covers basic issues in human resources management relevant to managing in international and cross-cultural environments. Examines selection and training of personnel for work in multicultural environments, managing the international employee in the United States and abroad, cross-cultural communication, international environments, special issues of concern to small business, and change in multinational companies. *Prereq. Junior standing.*

HRM 1814 Managing Ethical Dilemmas in Business (Honors) 4 QH

Considers the ethical dilemmas that arise for managers whenever individual goals collide with larger responsibilities to the community, co-workers and employees, and the organizations to which they belong. Aims to increase awareness of, ability to analyze, and skills to cope with the often conflicting responsibilities and alternatives that underlie managerial dilemmas. Uses a seminar approach to explore managerial dilemmas across functional areas and to develop applied case scenarios. *Prereq. Honors participation or permission of instructor.*

HRM 1891 Honors Thesis in Progress 0 QH

HRM 1892 Honors Thesis 8 QH

HRM 1893 Honors Thesis in Progress 0 QH

HRM 1894 Honors Thesis 12 QH

International Business Administration

INB 1338 Introduction to International Business 4 QH

Focuses on the cultural, economic, and political aspects of domestic and foreign environments and their effect on the international operations of business firms. Topics include the principles, patterns, and potential of international trade and investments; the development of management strategies for international businesses; and the organization and management of the firm's international operations. *Prereq. Middler standing.*

INB 1352 Seminar in International Business 4 QH

Applies the concepts and skills acquired in other international and domestic courses. Focuses on solving managerial problems in international and multicultural contexts. Uses case analysis to focus on business strategy and policy related to international operations. Requires significant class participation, written analysis, and understanding of current issues. *Prereq. INB 1338 and senior standing.*

INB 1731 Cultural Aspects of International Business 4 QH

Covers, from a managerial perspective, issues that arise when a firm moves from its home country to a host country that has a different national culture. Focuses on United States-based firms that operate abroad. Also considers what happens to other nation's firms operating in the United States and in third-country environments. Analyzes how "corporate culture" evolves in the context of national culture and the impact on managers. *Prereq. Middler standing.*

INB 1735 Import and Export Management 4 QH

Covers the principles and practices of international trade through import and export. Focuses on management aspects and explores details required to engage all aspects of international trade. Topics include government regulations, transportation, insurance, marketing, and finance.

Management

- MGT 1115 Introduction to Business** 4 QH
Introduces the basic functions of management, team-taught by faculty from all areas of the College of Business Administration. Examines academic choices and career opportunities in business.
- MGT 1345 Legal Aspects of Business** 4 QH
Examines the legal aspects of business transactions and business relationships involving contracts and sale of goods under the Uniform Commercial Code, as well as product liability and agency law.
- MGT 1446 Managing Social Issues** 4 QH
Analyzes the concepts that provide the framework for understanding and managing the relationship between business and society. Emphasizes ethical concepts and their application. Considers management's strategic response to society's expectations, nationally and internationally, using the case method. *Prereq.* Junior standing.
- MGT 1450 Business Policy** 4 QH
Focuses on corporate strategy and its elements, including an analysis of the company, its resources, opportunities, environment, and decision makers. Emphasizes decision making and implementation of strategy while operating a company in the context of a business simulation. *Prereq.* Senior standing.
- MGT 1572 Law of Wills, Trusts, and Estates** 4 QH
Examines requirements of valid will, claims of and against estates; the administration of estates, both formal and informal; essential elements for the creation of a trust; kinds of trusts, including inter vivos and testamentary trusts; the rights, responsibilities, and liabilities of trustees; and the rights of beneficiaries. *Prereq.* Middler standing.
- MGT 1573 Bulk Sales and Bankruptcy** 4 QH
Examines bulk transfers, with detailed study of the Uniform Commercial Code, Article 6; the need of the transferor to give to the transferee a sworn list of all his creditors; the giving of notice to the listed creditors; the contents of the notice, what creditors are protected; and the legal consequences of failure to comply with the Code. Also deals with both voluntary and involuntary bankruptcies; the appointment and duties of the trustee; provable and dischargeable debts; priority of debts; discharge and acts that bar a discharge. *Prereq.* Middler standing.
- MGT 1574 Law in Society** 4 QH
Provides students the opportunity to acquire a broad view of their legal rights, obligations, and responsibilities in their relations with others and with the state. Includes study of torts, such as assault and battery, trespass, negligence, slander, libel, and deceit, and crimes such as homicide, assault and battery, robbery, arson, larceny, and burglary. *Prereq.* Middler standing.
- MGT 1575 Negotiations** 4 QH
Focuses on broadening the students' understanding of the negotiations process, emphasizing the strategies and techniques that might be employed in that process. Includes familiarization with related literature, student role playing, and interaction with professionals involved in private- and public-sector negotiations.
- MGT 1580 Intercultural Negotiation and Conflict** 4 QH
Focuses on effective management in multicultural environments and the need for negotiating skills beyond basic bargaining tools. Considers such psychological and sociological factors as stereotyping, discrimination, biculturalism, intercultural conflict, cultural factors in negotiation, and cultural hegemony. Provides the opportunity to apply these and related ideas to such practical situations as negotiating relationships among intercultural groups, negotiating across cultures, and understanding relationships between competing cultures.
- MGT 1591 Independent Study** 1 QH
This course is for the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.
- MGT 1592 Independent Study** 2 QH
Same as MGT 1591.
- MGT 1593 Independent Study** 3 QH
Same as MGT 1591.
- MGT 1594, MGT 1595, MGT 1596, MGT 1597 Independent Study** 4 QH each
Same as MGT 1591.
- MGT 1720 Labor Law** 4 QH
Helps acquaint the student with the many constitutional and legal problems involved in labor organizing, industrial relations, labor negotiations, labor contract enforcement, and dispute resolution. Examines cases for the legal principles underlying the common law, state and federal laws, and the constitutional questions of power and authority. Also considers the Sherman Act, Clayton Act, Norris-LaGuardia Act, and Labor Management Relations Act. *Prereq.* Middler standing.
- MGT 1820 Independent Study (Honors)** 4 QH
Offers directed study toward fulfillment of Honors Program requirements and is open only to students who have been accepted into the Honors Program. Procedures for arranging the honors independent study are the same as those for MGT 1594.
- MGT 1832 Managing Product Innovation in Large Companies (Honors)** 4 QH
Introduces conventional, single-product approaches to product development and then considers innovation from a series of broader managerial and technological perspectives, combining theory and applications. *Prereq.* Honors participation or permission of instructor.
- MGT 1891 Honors Thesis in Progress** 0 QH
- MGT 1892 Honors Thesis** 8 QH
- MGT 1893 Honors Thesis in Progress** 0 QH
- MGT 1894 Honors Thesis** 12 QH

Management Science

MSC 1200 Business Statistics 1

4 QH

Studies statistics, which is the methodology concerned with data collection, analysis, and interpretation. Discusses the information that is generated by statistical methods and used for analyzing decisions in the face of uncertainty. Introduces fundamental concepts and methodology of statistics, probability distribution, estimation, and hypothesis testing. *Prereq.* MTH 1114.

MSC 1201 Business Statistics 2

4 QH

Continues topics covered in MSC 1200. Includes chi-square tests, simple and multiple regression-correlation analysis, and elementary concepts of time series analysis. *Prereq.* MSC 1200.

MSC 1226 Introduction to Computer Applications in Business

4 QH

Introduces personal computers with business applications, as well as microcomputers, spreadsheets, word processing, and databases. Covers the basic information systems concepts. Requires students to analyze a business case, applying their technology and problem-solving skills.

MSC 1330 Data Management

4 QH

Builds on the functional skills learned in MSC 1226. Covers database design, selection and use of a database software package, security and privacy, viruses, and data recovery. Expects students to create a small database complete with data entry screens and management reports. *Prereq.* MSC 1226.

MSC 1332 Decision Support Systems for Business

4 QH

Provides students with an understanding of the impact of computer-based tools on business decision making. Builds upon the computer literacy foundation established in MSC 1226. Covers decision support software such as graphics and expert systems on both mainframe and microcomputers. Gives students the opportunity to build a decision support system and create the supporting system documentation and user manual in a course project. *Prereq.* MSC 1226.

MSC 1335 Telecommunications and Networks

4 QH

Reviews business telecommunications. Focuses on the design, management, and use of data, video, and voice networks. Provides an overview of different operating systems, network topology, and management. Covers business uses of electronic communication such as Electronic Data Interchange and electronic mail, teleconferencing, and distributed applications. Explores the impact of telecommunications on business operations and competitive strategy. Includes assignments that give hands-on experience with network technology and a research paper about the business impact of telecommunications. *Prereq.* MSC 1226.

MSC 1336 Business Programming

4 QH

Provides students with a first course in programming, using the language C++. Introduces the logical structure of a programming language, object oriented programming, and data structures. *Prereq.* MSC 1226.

MSC 1341 Information Resource Management

4 QH

Examines the major organizational and managerial issues associated with using information systems in business. Includes a discussion of security and control in accounting information systems, time and quality issues in manufacturing information systems, and the strategic use of information technology to gain competitive advantage. *Prereq.* MSC 1226 and junior standing.

MSC 1342 Business Systems Integration

4 QH

Explores strategies for the functioning integration of information systems in both the office and the factory by examining actual problems in company settings, analyzing their data needs, and recommending a strategy for data and architecture. *Prereq.* MSC 1226, MSC 1330, and MSC 1335.

MSC 1350 Data Management

4 QH

Builds on the functional skills learned in MSC 1226, exposing students to the essentials of data management. Includes database design, selection and use of a database software package, security and privacy, viruses, and data recovery. Includes a project that requires students to create a small database complete with data entry screens and management reports. *Prereq.* MSC 1226.

MSC 1433 Quantitative Models in Business

4 QH

Focuses on the construction of appropriate mathematical models (simplified representations or abstractions of reality) for managerial decision-making problems. Discusses criteria for selecting various stochastic and deterministic models. Covers decision trees, decision analysis, linear programming, and simulation. *Prereq.* MSC 1201.

MSC 1441 Operations Management

4 QH

Considers the productive system of an enterprise whereby inputs of technology, materials, personnel, and information are transformed into useful goods and/or services. Introduces the types of problems and issues encountered by the operations manager. Discusses various models and techniques but emphasizes problem formulation and managerial implications. *Prereq.* MSC 1201.

MSC 1501 Purchasing and Materials Management

4 QH

Examines decisions related to the flow of materials from supplier to point of use. Emphasizes problems related to purchasing, including negotiation, value analysis, and supplier selection. Emphasizes materials management in manufacturing organizations, but also covers nonprofit and non-manufacturing concerns. Applies latest research in field gleaned from projects sponsored by the National Association of Purchasing Management and the American Production and Inventory Control Society. *Prereq.* MSC 1441.

MSC 1553 Decision Analysis

4 QH

Focuses on the analysis of decision making, with particular emphasis on realistic problems under uncertainty. Aims to help improve the student's ability to make better decisions through a careful consideration of alternative courses of action and their consequences, relevant objectives, and the element of risk. Covers the basic components of decision problems, the concepts of risk and utility, decision trees, and value of information and multicriteria decision-making. *Prereq.* MSC 1201.

MSC 1566 Quality Management

4 QH

Examines the basic philosophy of quality and its management both in Japan and in the United States. Stresses the changing role of quality as an emerging strategic factor in the United States. Discusses managerial, behavioral, and statistical methods based on measurement for achieving quality. Introduces the student to various aspects of quality management relevant to lower, middle and upper level of management; quality control circles; quality and continuous process improvements; and the philosophy of quality experts such as Deming, Juran, and Ishikawa. *Prereq.* MSC 1200, MSC 1201, and MSC 1441.

MSC 1591 Independent Study**1 QH**

This course is for the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

MSC 1592 Independent Study**2 QH**

Same as MSC 1591.

MSC 1593 Independent Study**3 QH**

Same as MSC 1591.

MSC 1594, MSC 1595, MSC 1596, MSC 1597 Independent Study**4 QH each**

Same as HRM 1591.

MSC 1700 Business Statistics 1 (Honors)**4 QH**

See course description for MSC 1200.

MSC 1701 Business Statistics 2 (Honors)**4 QH**

See course description for MSC 1201.

MSC 1726 Introduction to Data Processing (Honors)**4 QH**

See course description for MSC 1226.

MSC 1826 Business Forecasting (Honors)**4 QH**

Focuses on analyzing data using statistical models from various functional areas of business. Students prepare reports based on actual data that emphasize forecasting.

MSC 1828 Strategies for Environmentally Responsible Organizations**4 QH**

Discusses how management decisions regarding product design, production methods, facility location and distribution channels, and service policies may have direct environmental consequences. Focuses on the operational strategies and tactics in manufacturing and non-manufacturing organizations that deal with environmental problems. Reviews federal and state environmental policy and legislation and examines the specific actions of producers and service producers. *Prereq. Honors participation or permission of instructor.*

MSC 1891 Honors Thesis in Progress**0 QH****MSC 1892 Honors Thesis****8 QH****MSC 1893 Honors Thesis in Progress****0 QH****MSC 1894 Honors Thesis****12 QH**

analytical abilities and sharpen their communications skills. Covers topics that range from techniques used to analyze a market to the development of a total marketing strategy (product policy, pricing policy, promotion policy, and distribution policy). *Prereq. MKT 1435 and middler standing.*

MKT 1341 Marketing Research**4 QH**

Focuses on the survey research process and the analysis of data using "canned" computer programming routines. Covers topics such as problem definition, research design, sampling techniques, questionnaire development, data collection methods, and data analysis. Students expected to work on group projects with participating firms. Requires no previous computer experience. *Prereq. MKT 1331 and MSC 1201.*

MKT 1351 Competitive Strategy**4 QH**

A capstone marketing course, required of all students with a marketing concentration. Focuses on the formulation of marketing strategy at a policy level and its implementation in a dynamic environment. *Prereq. MKT 1331, MKT 1341, and senior standing.*

MKT 1435 Introduction to Marketing**4 QH**

Consists of lectures, readings, and small-group discussions on the role of marketing in contemporary society, in the business enterprises, and in the nonprofit organization. Considers the planning, operation, and evaluation of marketing and promotional efforts necessary to the effective marketing of consumer and industrial products and services in both profit and nonprofit organizations. *Prereq. Middler standing.*

MKT 1501 Introduction to Retailing**4 QH**

Explores the range of retail firms that make up the retailing industry, from large mass merchandisers to small specialty outlets. Examines the functions, practices, and organizations of various store types. Considers such topics as current issues, career opportunities, the environment of retailing and retailing's role in the economy. *Prereq. Middler standing.*

MKT 1503 Retail Merchandising and Control**4 QH**

Examines the concepts and techniques of store operations and merchandise management. Considers topics such as calculating and planning markups and markdowns, pricing, inventory control, stock turn, open-to-buy, profitability analysis, and expense control. *Prereq. MKT 1435 or permission of instructor.*

MKT 1523 Advertising Management**4 QH**

Focuses on the management of the advertising function in relation to a firm's overall marketing objectives. Approaches the subject from the perspective of the user of advertising (for example, the product manager and the marketing manager). Uses case studies and text material to help the student develop decision-making skills. *Prereq. MKT 1331 and middler standing.*

MKT 1531 Sales Management**4 QH**

Helps the student develop decision-making skills necessary for both building and maintaining an effective sales organization. Uses cases and readings to examine the strategic and operating problems of the sales manager. Includes such major topic areas as the selling function, sales management at the field level, and the sales executive. *Prereq. MKT 1331 and middler standing.*

Marketing

MKT 1331 Marketing Management**4 QH**

Provides training in marketing decision making. Uses case studies simulating actual business settings to help students develop

MKT 1542 Industrial Marketing 4 QH

Examines the marketing of products where business firms are the potential customers. Upperclass elective, open to juniors and seniors. *Prereq. MKT 1331 and middler standing.*

MKT 1545 New Product Development 4 QH

Examines and analyzes the problems firms face in directing and managing their new product development activities. *Prereq. MKT 1331.*

MKT 1553 Foundations of Consumer Behavior 4 QH

Helps students develop an understanding of consumer attitudes and behavior processes as the basis of the design of marketing problems. Considers economic and behavioral models of consumer behavior and underlying behavioral theories and concepts. *Prereq. MKT 1331 and middler standing.*

MKT 1591 Independent Study 1 QH

This course is for the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

MKT 1592 Independent Study 2 QH

Same as MKT 1591.

MKT 1593 Independent Study 3 QH

Same as MKT 1591.

MKT 1594, MKT 1595, MKT 1596, MKT 1597 Independent Study 4 QH each

Same as HRM 1591.

MKT 1735 Introduction to Marketing (Honors) 4 QH

Explores the role of marketing in contemporary society, business enterprises, and nonprofit organizations through lectures, readings, and small group discussions. Considers planning, operating, and evaluating marketing and promotional efforts that are necessary to effectively market consumer and industrial products and services in both profit and nonprofit organizations. *Prereq. Middler standing and honors participation.*

MKT 1760 International Marketing 4 QH

Introduces those aspects of marketing that are unique to international business within the framework of traditional functional areas of marketing. Focuses on the environment and the modifications of marketing concepts and practices necessitated by environmental differences. Includes such topics as cultural dynamics in international markets, political and legal environmental constraints, educational and economic constraints, international marketing research, international marketing institutions, and marketing practices abroad. *Prereq. MKT 1331 and middler standing.*

MKT 1810 Seminar in Advertising and Promotion Strategy 4 QH

Introduces a variety of topics in advertising and promotional strategy, including communications and persuasion theory, creative execution and message strategy, media planning, and the use of expert systems in advertising management. Employs a computer simulation, Adstrat, to develop advertising plans in a project-based format. Allows students to examine various "what if" scenarios to reinforce strategic decisions made in advertising and promotions management. *Prereq. Honors participation or permission of instructor.*

MKT 1812 New Products and the Management of Innovation (Honors) 4 QH

Focuses on the issues, problems, and decisions surrounding the innovation or new product development (NPD) process. Examines the nature of innovation, new product and technology strategy, the stages of the new product development process, the diffusion process, the R&D/marketing interface, and organizational structures of NPD. Uses readings, cases, exercises, and a project to illustrate important concepts. *Prereq. Honors participation or permission of instructor.*

MKT 1891 Honors Thesis in Progress 0 QH**MKT 1892 Honors Thesis 8 QH****MKT 1893 Honors Thesis in Progress 0 QH****MKT 1894 Honors Thesis 12 QH**

Logistics and Transportation

TRN 1333 The Domestic Transportation System 4 QH

Examines the structure, operations, and problems of the several modes of transportation, and outlines the government role in regulation and promotion. Also highlights the interaction between carriers and shippers in the transportation marketplace.

TRN 1335 Current Issues in Logistics and Transportation 4 QH

Identifies important contemporary issues and problems in logistics and transportation and examines their nature and significance. Explores alternative approaches to resolving such problems by analyzing various options and their implications.

TRN 1344 Business/Logistics 4 QH

Analyzes the role and activities of those involved in corporate logistics decision making. Emphasizes the importance of transportation planning, inventory control, warehousing, customer service standards, and location decisions in the design and operation of distribution systems.

TRN 1353 Seminar in Transportation and Logistics 4 QH

Focuses on a limited number of advanced transportation/logistics topics. Offers students experience with business and government through individual research topics selected for class presentation/discussion. *Prereq. Senior standing or permission of instructor.*

TRN 1514 Carrier Management 4 QH

Examines the perspective of those involved in managing the several modes of transportation. Emphasizes the decision-making process related to such issues as carrier financing, pricing, labor relations, and equipment selection.

TRN 1528 Urban Transportation 4 QH

Focuses on the movement of people and freight in and around metropolitan areas. Examines the role of transit managers in planning, implementing, and operating mass transit systems. Also outlines how various governmental units participate in financing and regulating urban transportation.

TRN 1591 Independent Study 1 QH

This course is for the student who has received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study will take place. A copy of the final report prepared by the student will be presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from area coordinators.

TRN 1592 Independent Study 2 QH

Same as TRN 1591.

TRN 1593 Independent Study 3 QH

Same as TRN 1591.

TRN 1594, TRN 1595, TRN 1596, TRN 1597 Independent Study 4 QH each

Same as TRN 1591.

TRN 1721 Labor/Management Issues in Transportation 4 QH

Focuses on labor in the transportation industries. Examines trends in employee compensation, productivity, bargaining patterns, and influence of government policies on labor/management issues.

TRN 1760 International Transportation and Logistics Management 4 QH

Analyzes the managerial activities of logistics planning and operations in multinational firms. Focuses on contemporary issues that affect the design of international logistics systems, and examines the current and future status of ocean and air transportation in international trade and development.

TRN 1891 Honors Thesis in Progress 0 QH**TRN 1892 Honors Thesis 8 QH****TRN 1893 Honors Thesis in Progress 0 QH****TRN 1894 Honors Thesis 12 QH**

Computer Science

COM 1100 Fundamentals of Computer Science*

4 QH

Introduces computers and computer programming. Studies basic concepts of a high-level language such as data types, variables, assignment, expressions, statements, and input/output. Surveys structured programming tools including flow control constructs, procedures and functions, parameters, local variables, and user-defined data structures. Discusses the string and array data structures in detail. Introduces graphics and animation. Emphasizes the systematic design of programs using structured components.

COM 1101 Algorithms and Data Structures I

4 QH

Introduces algorithms, data structures, abstraction, and modularization. Discusses elementary sorting and searching. Studies data structures such as records and combinations of arrays and records, external text and binary files, linked lists, stacks and queues. Introduces recursion as a technique for the rapid design of complex algorithms. *Prereq.* COM 1100, COM 1108 or equiv.

COM 1102 Symbolic Programming and Its Applications

4 QH

Introduces the fundamental concepts and applications of functional programming and their relationship to computer science. Reviews basic ideas underlying symbolic information processing and the role of LISP in this context. Covers applications selected from artificial intelligence, programming language design and implementation, procedural and data abstraction, and development of data-driven programs. *Prereq.* COM 1101.

COM 1105 Computer Science and Its Applications

4 QH

Provides an opportunity for students of all majors to understand and experience the computer science field and to become informed and intelligent users of its tools. Explores using the computer as a fundamental component of the problem solving process. Discusses the basic principles as well as relevant historical, social, cultural, and ethical issues. Provides hands-on experiences with applications such as word processors, spreadsheets, database management systems, Hypercard, graphics-statistics packages, and simulations. *Not open to computer science majors.*

COM 1107 Introduction to Programming I

4QH

Discusses important themes and ideas in computer science and introduces students to writing computer programs. Utilizes simple computer graphics in addition to text input-output. Examines variables, assignment, and flow control with loops and decisions. Explores algorithms, program design, and problem solving using procedures and functions.

COM 1108 Introduction to Programming 2

4QH

Continues discussing important themes and ideas in computer science. Examines data structures in programming, including arrays, string, user-defined data types, records, combinations of arrays and records, text-file input-output, and simple sorting methods. Focuses on a systematic approach to problem solving and program design through appropriate abstractions. Emphasizes visualizing concepts through computer graphics. *Prereq.* COM 1107.

*Students should take either COM 1100 or the pair of courses COM 1107 and COM 1108. Additional concepts and examples are introduced in COM 1107 and COM 1108, and the pace is somewhat slower than that in COM 1100.

COM 1110 FORTRAN Laboratory

1 QH

Considers elements of FORTRAN programming for those familiar with a high-level language such as Pascal or C. Includes input/output, subroutine linkage, and methods of structured programming in FORTRAN. *Prereq.* COM 1100.

COM 1114 C Laboratory

1 QH

Examines elements of C programming for those familiar with a high-level language such as Pascal and with elementary data structures. Emphasizes how C combines tools for structured programming with mechanisms for producing efficient code. Introduces UNIX. *Prereq.* COM 1101.

COM 1115 Introduction to Computers I

1QH

Introduces students to personal computers and how they can enhance productivity. Discusses the basic operations and style of interaction on Macintosh and MS-DOS computers. Teaches word processing in both environments. Introduces drawing and painting programs for creating presentation graphics. *Students may take either COM 1105 or the sequence COM 1115, COM 1116, and COM 1117, but not both. Not open to computer science majors.*

COM 1116 Introduction to Computers 2

1QH

Discusses using spreadsheets for data analysis. Describes how to create charts and graphs for data presentation. Introduces simple data management tasks and elementary programming via Hypercard. *Prereq.* COM 1115 or equiv. *Students may take either COM 1105 or the sequence COM 1115, COM 1116, and COM 1117, but not both. Not open to computer science majors.*

COM 1117 Introduction to Computers 3

1 QH

Discusses the design and use of relational databases for sophisticated data management tasks. Utilizes packages for statistical and graphic analysis of data. Introduces computer simulation. *Prereq.* COM 1115 and COM 1116 or equiv. *Students may take either COM 1105 or the sequence COM 1115, COM 1116, and COM 1117, but not both. Not open to computer science majors.*

COM 1121 Computer Science Overview I

1 QH

Reviews and gives practice to the intellectual skills needed for success as a computer science major. Discusses issues that can affect academic success and introduces the intellectual and cultural opportunities at Northeastern University and in Boston. Includes readings about major figures in computing and guest lectures that survey advanced fields in computer science. Looks ahead to professional work in computer science. *Prereq.* Computer science major.

COM 1122 Computer Science Overview 2

1 QH

Continues COM 1121.

COM 1130 Computer Organization and Programming I

4 QH

Introduces computer organization and programming at the assembly-language level. Topics include arithmetic instructions, memory organization and data representation, addressing modes, flow control instructions, subroutines, procedures and linkage with higher-level languages, run-time stack structure, implementation of recursion, floating point and bit instructions, terminal I/O using system services or higher-level languages, and use of the debugger. *Prereq.* COM 1101.

COM 1201 Algorithms and Data Structures 2**4 QH**

Introduces complex data structures and the corresponding algorithms for manipulation. Examines trees; binary search; priority queues, heaps, and heapsort; and quicksort. Introduces analysis of algorithms. Surveys graphs; depth-first and breadth-first search; shortest path and minimal spanning tree; sets, union, and find; hashing; and balanced trees. *Prereq.* COM 1101 and MTH 1137.

COM 1204 Object-Oriented Design**4 QH**

Introduces the philosophy and methodology of object-oriented design utilizing a modern, full-featured, object-oriented programming language. Considers the concepts of class, instance, data member, and method. Organizes classes into hierarchies, uses class inheritance to efficiently create a variety of related classes, and develops class libraries as the foundation for systematic software design. Applies object-oriented design to small and medium scale projects and compares object-oriented methods to other paradigms of software design. *Prereq.* COM 1101 and COM 1114, or permission of the instructor.

COM 1205 Software Design and Development**4 QH**

Presents the latest ideas and techniques in software methodology and provides a means for students to apply these techniques. Students, working in groups, will be expected to design, implement, test, and document a large software project. *Prereq.* COM 1201.

COM 1310 File Structures**4 QH**

Focuses on analyzing file structure organizations in terms of seek time, rotational latency, and data transfer time for magnetic disk drives. Studies external sorting, B-trees, and hashing algorithms. Introduces applying simple mathematical methods to the performance analysis of various file structures. *Prereq.* COM 1201.

COM 1315 Database Design**4 QH**

Focuses on designing a database for use in a relational database management system. Uses the entity-relationship model and normalization on example problems. Presents the SQL language. Topics may include the network model, the hierarchical model, or the object-oriented model. Nonmajors with programming experience in PASCAL or C are welcome. Requires implementing a database schema and short application program on a commercial database management system. *Prereq.* COM 1101 or programming experience in a high-level language.

COM 1316 Database Management 2**4 QH**

Focuses on database systems that support relational model applications. Topics include recovery, query optimization, integrity, and security and concurrency, with examples based on INGRES and System R. Covers additional topics such as database machines at the discretion of the instructor. Implements a small relational DBMS. *Prereq.* COM 1315.

COM 1317 Transaction Processing Systems**4QH**

Focuses on the concepts and practice of modern transaction processing systems in a distributed setting. Describes the overall architecture of systems such as TP monitor, recovery manager, log manager, and lock manager. Discusses the principles of DO/UNDO/REDO logging such as the write-ahead log rule and the force log-on-commit rule. Describes compensation log records, checkpoint and restart recovery procedures, two-phase commit, lock tables, granularity of locking, and two-phase locking. *Prereq.* COM 1310 and COM 1315.

COM 1330 Operating Systems Concepts**4 QH**

Introduces basic structure, components, design, implementation, and internal operation of the kernel of computer operating systems. Surveys operating systems history, Input/Output device management, process environment, CPU scheduling, concurrent processes and synchronization, interprocess communication mechanisms, memory management, and device drivers. Uses examples from many operating systems (MS-DOS, UNIX) to reinforce concepts. Includes a lab to expose students to the system concepts through programming exercises. *Prereq.* COM 1140 and COM 1130, or equiv.

COM 1335 Operating Systems Design**4 QH**

Continues COM 1330. Discusses components needed to create commercial operating systems. Covers security and access control, resource allocation, deadlock management and resolution, file system structures, and distributed operating systems. Offers examples from many operating systems (UNIX, VMS) to reinforce concepts. Requires programming and modifying operating system components through labs. *Prereq.* COM 1330.

COM 1336 Operating Systems 2**4 QH**

Explores advanced topics in operating system design. Allows students to complete the study of device management begun in COM 1335 and implement a device driver for a small operating system. Covers topics in theoretical aspects of operating system design such as mechanisms for high- and low-level synchronization, deadlock, distributed algorithms, management of paged memory, queueing theory, and computer security. *Prereq.* COM 1335 and MTH 1387.

COM 1337 Computer Communication Networks**4 QH**

Explores data networking. Focuses on concepts, technology, and implementation issues. Discusses distributed system requirements, network architectures, OSI model, communication protocols, routing algorithms, local area networks, public data networks, vendor network architecture, PC networks, standards, internetworking, network management, and performance issues. Uses examples from real networks (such as IBM, SNA, DEC's DECnet, Ethernet, Token Ring, and X.25) to reinforce theory. Requires using real networks and designing and implementing communication protocols. *Prereq.* COM 1330.

COM 1350 Automata and Formal Languages**4 QH**

Topics include finite-state machines and regular expressions; context-free grammars; properties and decidability problems of regular and context-free languages; pushdown automata; pumping theorems for regular and context-free languages; and Turing machines, Church's thesis, and the halting problem. *Prereq.* COM 1201 and MTH 1137.

COM 1355 Compiler Design 1**4 QH**

Implements concepts such as finite state automata, regular expression pattern matching, and contextfree grammars using a lexical analyzer and a compiler-compiler. Emphasizes LALR(1) or LL(1) parsing with exposure to top-down, bottom-up, and operatorprecedence methods. Examines ambiguous grammars and may include some code generation. Uses a "hands-on" approach, including either a sequence of programming assignments or a project. *Prereq.* COM 1131 and COM 1350.

COM 1356 Compiler Design 2**4 QH**

Discusses advanced topics related to code generation: run-time environment, symbol table organization, and scope rules. Other

topics include type checking, aggregate types (arrays and records), error analysis and recovery, code optimization, tail recursion, functional programming, and polymorphic functions. Implements theoretical ideas through programs or a large project. *Prereq.* COM 1355.

COM 1358 Analysis of Programming Languages 4 QH

Topics include run-time behavior of programming languages; interpreters; static and dynamic scoping; parameter-passing mechanism; implementation of functions and recursion; and features of current languages and their implementation. *Prereq.* COM 1102.

COM 1370 Computer Graphics 4 QH

Focuses on characteristics and programming of graphics output devices. Presents basics point and line drawing, two-dimensional displays, and clipping and windowing. Surveys pictures: data structures and display file organization; and interaction: graphical input and external events-operating system considerations. Includes some three-dimensional drawing. *Prereq.* COM 1201 and MTH 1301.

COM 1390 Algorithms 4 QH

Introduces the basic principles and techniques of analyzing algorithms. Topics include algorithms on sorting, searching, graphs, and digraphs (such as minimal spanning tree, shortest path, depth-first search, components of a graph); and methods involving string matching, polynomials and matrices. Considers fast Fourier transform and the concept of N P-complete problems. *Prereq.* COM 1201, MTH 1125, MTH 1137, and MTH 1301.

COM 1400 Data Parallel Computing 4 QH

Introduces the basic concepts of parallel computer architectures, network topologies, and data parallel programming. Emphasizes SIMD machines with mesh or hypercube interconnection networks. Studies fundamental data structures and data parallel algorithms for matrix operations, fast fourier transforms, and graph and geometric computations for complexity and performance characteristics. Requires a significant amount of programming to complete course assignments.

COM 1410 Artificial Intelligence 4 QH

Focuses on analysis of current computer algorithms dealing with problems such as theorem proving, chess playing, general problem solvers, robotics, symbolic computation, perceptions, and self-reproducing automated parallel machines. *Prereq.* COM 1102, COM 1201, and MTH 1409.

COM 1420 Principles and Methods in Interactive Systems Design 4 QH

Introduces principles of computer-human interface (software) design, and methodologies of implementation, evaluation, and research in computer-human interaction. Topics include user psychology, dialog styles (menu interfaces, command languages, icons, windows), screen layout and design, input and output devices (mouse, touchscreen, keyboard, voice technology), error handling/reporting and system response time, user documentation, and "intelligent" interfaces. Traces techniques for implementing software-human interfaces, and methodologies for testing and assessing the "usability" of interactive systems.

COM 1600 Computer Science Project 4 QH

Presents the latest ideas and techniques in software methodology and provides a means for students to apply these techniques. Students, working in groups, will be expected to design, imple-

ment, test, and document a large software project. *Prereq.* COM 1102, COM 1110, COM 1201, and COM 1355.

COM 1621 Computer Science Seminar 1 QH

A capstone course for computer science majors. Meetings are held once or twice per week and a current topic or problem in computer science is presented by an expert in the subject matter. Students are assigned additional questions and/or problems to research in the topic area as an aid to developing a deeper appreciation and understanding of various aspects of computer science. *Prereq.* Computer science seniors only.

COM 1700, COM 1701, COM 1702, COM 1720, COM 1730 4 QH each

Offers a special section for honors students in COM 1100, COM 1101, COM 1102, COM 1201, and COM 1130, respectively. *Prereq.* Enrollment in the Honors Program or permission of the instructor.

COM 1705, COM 1717, COM 1737, COM 1757 5 QH each

Offers a special section for honors students in COM 1205, COM 1316, COM 1335, and COM 1350 respectively. *Prereq.* Enrollment in the Honors Program or permission of the instructor.

COM 1770 Computer Science Seminar (Honors) 4 QH

Offers a capstone course for computer science honors students. Exposes students to a variety of computer science topics of current interest, and provides an opportunity to improve skills in presenting technical material. Requires students to prepare a one hour presentation of professional quality on a topic of interest in computer science. Requires the student to write paper on the same topic.

COM 1777 Honors Adjunct Computer Science 1 QH

Allows honors students who do not have an honors section to do honors work in one of the computer science elective courses while enrolled in the regular course.

COM 1800 Directed Study in Computer Science 4 QH

Programs of directed study, held one or more quarters, are available for highly motivated students who wish to explore in depth special topics in computer science. Directed study can be used as an opportunity to examine familiar material in fresh ways or to explore new material that is not offered in formal courses. Provides students strong in computer science and related sciences a chance to develop the art and skill needed to work independently and creatively in computer science. *Prereq.* Permission of the instructor; may be repeated for credit.

COM 1810 Topics in Computer Science 4 QH

Focuses on an advanced topic in computer science to be selected by the instructor. *Prereq.* Permission of the instructor.

Cooperative Education

COP 1135 Professional Development for Journalists

1 QH

Provides current career information in the field of journalism primarily through outside speakers. Prepares journalism students for field experience. Employs current preferred learning and working style models for self exploration.

COP 1180 Career Decision-Making

4 QH

Focuses on needs and concerns of students who may be undecided or uncertain about their academic major or career direction. Addresses the needs of the group, as well as individual participants, and emphasizes self-assessment, career exploration, decision making, and goal setting. *Prereq. Freshmen or sophomores in any major or permission of instructor.*

COP 1220 Working in the United States

4 QH

As a career development course for international students in their freshman through middler years, helps students compete more effectively for cooperative education positions in the United States and assists them in their cultural transition into the American work force. Considers work-oriented cross-cultural

issues, the American work ethic, skills development, resume writing, and interviewing techniques. *Prereq. International students in first or second year in the United States, or permission of instructors.*

COP 1314 Life/Career Planning

4 QH

Focuses on career exploration, self-assessment, job-search techniques, and networking. Requires students to prepare a professional resume, to participate in videotaped mock interviews, to research careers, and to investigate graduate and professional schools. *Prereq. Junior or senior standing or permission of instructor.*

COP 1353 Professional Development for Education

1 QH

Examines career management issues for fourth-year students. Discusses work and personal values, current issues in the employment market, planning for graduate study, organizing and conducting a job search, advanced resume preparation, and interviewing techniques.

Criminal Justice

CJ 1101 Administration of Criminal Justice

4 QH

Surveys the contemporary criminal justice system from the initial contact with the offender through prosecution, disposition, incarceration, and release to the community. Emphasizes major systems of social control: police, corrections, juvenile justice, mental health systems, and their policies and practices relative to the offender. Maintains balanced study by providing legal, empirical, and sociological materials.

CJ 1112 Critical Issues in Criminal Justice

4 QH

Introduces students to the major issues and ethical considerations facing criminal justice and criminology today. Discusses six to eight major critical, moral, and ethical issues. Considers such core topics as the death penalty, abortion, euthanasia, abolition of the insanity plea, victimless crimes (prostitution, drug abuse, gambling), and gun control. Presents these issues in the format of pros and cons; involves student presentations or debates.

CJ 1151 Introduction to Law and the Legal Process 1

4 QH

Provides an introduction to the law and the legal system of the United States. Sets forth the fundamentals of our legal process and provides a summary description of both the private and public law system. Presents an overview of the traditional structure, as well as the basic principles of law.

CJ 1152 Introduction to Law and the Legal Process 2

4 QH

Continues the material presented in CJ 1151. Introduces basic tort and contract principles, administrative law, and governmental regulation of business, topics of particular concern to criminal justice professionals in both the public and private sectors, as well as to those students concentrating in legal studies. *Prereq.* CJ 1151 and CJ 1252.

CJ 1201 Criminology

4 QH

Introduces the major theories of crime causation developed over the past two centuries. Explores the scope and nature of the current crime problem in the United States. Examines the characteristics of specific criminal behavior such as violent crime, property crime, organized crime, white-collar crime, and public order crime.

CJ 1251 Introduction to Criminal Law

4 QH

Deals with the area of criminal responsibility, some of its limitations, and certain modifications substantially affecting it. Requires an ability to express in writing both the knowledge of a particular concept and the ability to identify it in a complex fact pattern and discuss its implications and ramifications.

CJ 1252 Criminal Due Process

4 QH

Focuses on a historical evaluation of the Fourteenth Amendment and its use in making rights prescribed under the Bill of Rights applicable to the individual states. Also details the inherent problems of the Fifth and Sixth Amendments, including the effect of their implications on such matters as police practices, illegal search and seizure, and right to counsel. Expects students to be familiar with basic concepts as well as changing interpretations so they can cite cases that may stand as precedents for conclusions they draw. *Prereq.* CJ 1251.

CJ 1253 Introduction to Criminal Courts

4 QH

Examines the role of criminal courts in the United States, the structure and organization of the court system, and the flow of

cases from arrest to conviction. Focuses on the key actors in the courtroom—prosecutors, defense attorneys, judges, and court clerks—and the decision-making processes in charging, setting bail, pleading guilty, going to trial, and sentencing. Addresses prospects for reforming courts. *Prereq.* CJ 1251 and CJ 1252.

CJ 1254 Civil Liability in Criminal Justice

4 QH

Studies the contemporary problems of civil liability affecting the criminal justice professional. Reviews cases involving police, security, probation, parole, and corrections personnel to help students understand and appreciate the legal factors, public policy issues, and methods of reducing the risk of civil liability. *Prereq.* CJ 1251 and CJ 1252.

CJ 1301 Introduction to Security

4 QH

Examines the organization and administration of security and loss prevention programs in industry, business, and government. Emphasizes the protection of assets, personnel, and facilities and focuses on the relations between security organizations and government agencies.

CJ 1311 White-Collar Crime

4 QH

Gives the student a basic understanding of white-collar crime. Covers such topics as the nature and extent of white-collar crime, the social-psychologic makeup of white-collar crime, typologies, current efforts directed toward controlling it, and the interagency and jurisdictional problems and the benefits of cooperation.

CJ 1314 Security Management and Supervision

4 QH

Deals with the roles and responsibilities of the security manager. Gives special attention to the responsibilities of planning, organizing, staffing, directing, controlling, representing, and innovating. Explores the manager's responsibility in professionalizing security and other relevant issues. *Prereq.* CJ 1301 or equiv.

CJ 1318 Terrorism

4 QH

Attempts to give the student an understanding of what terrorism is and why it has become so popular. Includes the role of news media, political consequences of terrorism, the military as a resource, and the role of the hostage.

CJ 1319 Legal Aspects of Security Management and Operations

4 QH

Provides a comprehensive examination of the legal environment and issues affecting security operations and management. Analyzes elements of criminal, civil, property, regulatory, and business law from the perspective of organizational security management concerns. Includes legal basis of security practices, civil liability, corporate security, investigations, labor law, industrial espionage, governmental security issues, and other relevant topics.

CJ 1401 Policing a Democratic Society

4 QH

Gives an understanding of the role and function of policing in a modern democratic society. Examines contemporary American policing in light of its Anglo-Saxon roots, and compares it to policing in other Anglo-Saxon countries (such as Canada and Australia), and other modern police systems. Examines police in light of contemporary major issues including race, index crime, drugs, disorder, conflict, and riot. Examines the contemporary shift from reform (professional) to community and problem-oriented policing.

- CJ 1411 Police Strategy** 4 QH
Examines the current organizational strategy of American police, their goals and mission, and the resources and tactics they adopt to pursue those goals. Emphasizes the authority and resources granted to police; police function, organization, and administration; the demand for police services; the relationship of police to their environment; police tactics; and the outcome for which police strive. Focuses on police accountability and effectiveness. *Prereq.* CJ 1401.
- CJ 1424 Seminar in Policing** 4 QH
Specific topic in policing to be announced. *Prereq.* CJ 1401, CJ 1411, and junior standing or above.
- CJ 1426 Topics in Policing** 4 QH
Specific topic in policing to be announced. *Prereq.* Junior standing or above.
- CJ 1427 Topics in Criminal Justice** 4 QH
Specific topic in criminal justice to be announced. *Prereq.* Junior or senior standing.
- CJ 1451 Criminal Justice Research** 4 QH
Surveys methods for basic and applied research in criminal justice, combining statistics and research methods. Concentrates on research application by stressing discussion of the general role of research in the discipline and specific contributions advanced by studies in the literature. *Prereq.* MTH 1010 or equiv., and middle standing or above.
- CJ 1501 Evidence 1** 4 QH
Provides students the opportunity to develop their understanding of the manner in which legal issues and disputes are resolved by trial. Focuses on the manner in which the trial system works and the reasoning behind the rules governing its operation, including rules of evidence: the mechanics of the adversary system, relevancy, reliability, and rules of exclusion based on policy considerations other than relevancy and reliability. Includes such learning tools as videotapes, mock trials, observation of actual court trials, lectures, take-home assignments, and exams. *Prereq.* CJ 1251 and CJ 1252.
- CJ 1502 Evidence 2** 4 QH
Continues with reliability and rules of exclusion, based on policy considerations other than relevancy and reliability, as set forth in CJ 1501. *Prereq.* CJ 1501.
- CJ 1512 Seminar in Law and Criminal Justice** 4 QH
Specific topic in the law and criminal justice to be announced. *Prereq.* CJ 1251, CJ 1252, and junior or senior standing.
- CJ 1513 Criminal Homicide** 4 QH
Surveys the topic of homicide. Explores general murder patterns and analyzes types of homicide emphasizing mass and serial killing. Discusses criminal justice issues in apprehension, prosecution, and punishment of murder.
- CJ 1601 Survey of Correctional Systems** 4 QH
Offers an introduction to penology and corrections. Explores the public reaction to convicted offenders historically, while concentrating on issues and programs of contemporary corrections. *Prereq.* CJ 1201.
- CJ 1612 Juvenile Justice** 4 QH
Gives an overview of the institutional response to the problems of juvenile delinquency, juvenile misconduct, and dependent/neglected and abused children. Emphasizes the police, court, and correctional agencies that process young people. In addition, devotes attention to an understanding of the history of the system, recent legal developments, and an assessment of current proposals for reform. *Prereq.* SOC 1100 and CJ 1201.
- CJ 1613 Probation and Parole** 4 QH
Examines the nature and problems of correctional field service, both adult and juvenile. *Prereq.* CJ 1601.
- CJ 1615 Crime and Criminal Justice: A Comparative View** 4 QH
Examines the problems of crime and its control from the vantage point of the comparative perspective. Analyzes countries such as Soviet Russia, China, France, East Germany, and West Germany. Also analyzes Great Britain, Holland, Finland, and Sweden in terms of their incidence and type of deviance and crime, as well as in terms of approach to social control and prevention of crime. Examines points of divergence between these countries and the United States in perceived causes of crime and differing approaches to rehabilitation and crime prevention. *Prereq.* CJ 1101, SOC 1100, or equiv.
- CJ 1616 Women and the Criminal Justice System** 4 QH
Introduces students to issues relating to roles taken by women involved with the criminal justice system and to the system's various responses to women in these roles. Focuses on women as victims of crime, as offenders, and as practitioners. *Prereq.* Middle standing or above.
- CJ 1618 Victims of Crime** 4 QH
Examines current theory and research regarding victims of crime. Devotes attention to concepts such as victim vulnerability and victim culpability. In addition, discusses the implications of a victim-oriented perspective for the administration of justice. Assesses current victim programs, including restitution, mediation, and compensation.
- CJ 1621 Incarceration** 4 QH
Offers in-depth familiarity with key reading in the history and sociology of incarceration. Topics include theories of incarceration; sentence determination; history of our incarceration systems; inmate and staff perspectives on incarceration; and special category inmates (mentally ill, rape victims, death row prisoners). Includes extensive discussion. *Prereq.* CJ 1301, middle standing or above, and QPA over B-; or permission of instructor.
- CJ 1801, CJ 1802, CJ 1803, CJ 1804 Directed Study** 4 QH each

Engineering

Chemical Engineering

The course descriptions listed under chemical engineering are intended to show the general scope of the subject that will be covered. Since courses are continually updated, specific topics or methods of approach may vary from term to term. In addition to meeting course prerequisites, students are expected to take each chemical engineering course in the sequence shown on the specimen program sheet.

CHE 1201 Chemical Engineering Calculations 1 4 QH

Examines the application of fundamental laws of mass and energy conservation to chemical and physical processes. Emphasizes material balances. A corequisite computational lab aids students in improving facility in handling problems typical of the course. Lab fee. *Prereq.* CHM 1132 and CHM 1138; CHE 1205 taken concurrently.

CHE 1202 Chemical Engineering Calculations 2 4 QH

Continues CHE 1201. Emphasizes energy balances and the simultaneous application of mass and energy conservation laws. Considers typical chemical processing industry problems. *Prereq.* CHE 1201.

CHE 1205 Computation Laboratory 2 QH

Offers lab sessions to aid students in problem formulation and solution. The assignments are based on material presented in CHE 1201. Emphasis is placed on computer software applications. Lab fee. *Prereq.* CHE 1201 taken concurrently.

CHE 1211 Chemical Engineering Thermodynamics 1 4 QH

Topics include the first law and its application to batch and flow systems, heat effects in chemicals, and physical properties of real fluids. Applies basic principles and mathematical relations to the analysis and solution of engineering problems. *Prereq.* CHE 1201 and CHE 1205.

CHE 1300 Chemical Engineering Calculations 2 4 QH

Emphasizes energy balances and the simultaneous application of mass and energy conservation laws in steady and unsteady state processes. Problems are selected from chemical processing industry applications. *Prereq.* CHE 1201 and CHE 1211.

CHE 1310 Chemical Engineering Thermodynamics 2 4 QH

Covers thermodynamic properties of mixtures; fugacity and the fugacity coefficients from equations of state for gaseous mixtures; liquid phase fugacities and activity coefficients for liquid mixtures; phase equilibria; the equilibrium constant for homogeneous gas-phase reactions; and extension of theory to handle simultaneous, heterogeneous, and solution reactions. *Prereq.* CHE 1300.

CHE 1321 Momentum Transport 5 QH

Covers topics such as physical properties of fluids, pipe flow for process application, fluid metering, macroscopic balances and their application, microscopic balances, and boundary layer and turbulent flow theory. *Prereq.* CHE 1211 and CHE 1300.

CHE 1415 Experimental Methods 1 5 QH

Presents a comprehensive approach to solving experimental chemical engineering problems. Requires students to design, conduct, and report on experimental work orally and in writing. Involves experiments in unit operations in process measurements, fluid metering, and heat exchangers. Includes lectures on the principles of laboratory safety and data handling techniques. Lab fee. *Prereq.* CHE 1321.

CHE 1416 Experimental Methods 2 5 QH

Continues CHE 1415, requiring more advanced experimentation and more extensive reports. Involves experiments in unit operations in distillation, evaporation, extraction, filtration, or separations. Requires oral and written communications. Lab fee. *Prereq.* CHE 1415.

CHE 1421 Chemical Engineering Kinetics 4 QH

Topics include fundamental theories of the rate of chemical change in homogeneous reacting systems; integral and differential analysis of kinetic data; design of batch and continuous-flow chemical reactors; and an introduction to heterogeneous reactions and reactor design. *Prereq.* CHE 1310.

CHE 1431 Heat Transport 5 QH

Presents the fundamentals of heat transport. Covers the design of heat transfer equipment and estimation of heat transfer rates. Includes conduction, convection, condensation, and boiling, and covers heat exchangers, evaporators, and driers. *Prereq.* CHE 1321.

CHE 1441 Separation Processes 5 QH

Describes the principles utilized in the physical separation of chemical mixtures. Covers filtration, evaporation, extraction, and distillation. Introduces equilibrium stages as applied to the separation of binary mixtures by liquid-liquid extraction and by continuous distillation. *Prereq.* CHE 1431.

CHE 1450 Chemical Engineering Economics 4 QH

Introduces financial decision-making techniques as applied to problems of production, storage, transportation, and utilization of chemical resources to meet societal needs. *Prereq.* ECN 1115.

CHE 1501 Chemical Process Design 1 6 QH

Focuses on the design of a chemical process. Topics include computer simulation of steady-state processing conditions, selecting process operations, preparing flowsheets and stream tables, and evaluating the economics of a chemical process design. Explores a comprehensive chemical process design problem with a team approach. *Prereq.* CHE 1421 and CHE 1441.

CHE 1502 Chemical Process Design 2 6 QH

Continues CHE 1501. Requires each student to solve a comprehensive chemical process design problem. Includes topics such as heat and power integration in chemical processing, design and scheduling of batch processes, sequencing separation operations, and safety considerations in process design. *Prereq.* CHE 1501.

CHE 1503 Projects 1 6 QH

Offers individual research related to some phase of chemical engineering. Open only to students selected by the department

head on the basis of scholarship and proven ability. Lab fee.
Prereq. Senior standing and consent of department.

CHE 1504 Projects 2 6 QH
Continues the research work begun in CHE 1503. Lab fee. *Prereq. CHE 1503.*

CHE 1511 Mathematical Methods in Chemical Engineering 4 QH
Examines the formulation and solution of problems taken from chemical and engineering studies that require advanced mathematical methods. Emphasizes the formulation step, and discusses numeric and analytic solution techniques for solving sets of algebraic equations and for solving ordinary and partial differential equations. *Prereq. Senior standing.*

CHE 1512 Chemical Process Control 4 QH
Covers the Laplace transform and its use in solving ordinary differential equations; modeling and computer simulation of basic heat, mass, and fluid-flow dynamics; linearization of nonlinear systems; the transfer function; sensors, transmitters, valves, and controllers; block-diagram algebra; dynamics of higher-order systems; modeling and simulation of control-loop dynamics; frequency response; and Laplace and frequency domain stability analysis. *Prereq. Senior standing.*

CHE 1513 Introduction to Optimization 4 QH
Demonstrates elementary optimization techniques, such as gradient methods, pattern search, linear programming, and dynamic programming, as applied to a variety of elementary physical and chemical problems. *Prereq. Senior standing.*

CHE 1514 Special Topics 4 QH
Presents chemical engineering topics of interest to the staff member conducting the class. *Prereq. Senior standing.*

CHE 1516 Mass Transfer Operations 4 QH
Focuses on the mass transfer operations of crystallization, adsorption, chromatography, ion exchange, and membrane separations. *Prereq. Senior standing.*

CHE 1519 Polymer Science 4 QH
Introduces polymers and polymer chemistry, synthesis and reactions of polymers, and thermodynamics and kinetics of polymerization. Includes topics such as physical characterization of polymers; molecular structure, properties, and applications of polymers; and polymer processing and testing of polymers. *Prereq. CHE 1421 and CHM 1272.*

CHE 1520 Pollution Control in Chemical Industries 4 QH
Studies fundamental operations for handling environmental problems in the chemical process industries. Discusses water quality requirements and industrial waste characteristics. *Prereq. Senior standing.*

CHE 1521 Chemical Process Development 4 QH
Traces the manner in which a chemical process evolves from the research lab to full-scale production using typical processes as illustrations. Topics covered include economic factors, safety factors, batch vs. continuous operation, process evaluation, developing the flow sheet, and scale-up considerations. *Prereq. Senior standing.*

CHE 1523 Catalysis 4 QH
Introduces heterogeneous catalytic processes. Topics include mechanistic explanations, modeling of catalyzed reactions, and the application of catalysts to industrial practice. *Prereq. Senior standing.*

CHE 1524 Chemical Process Safety 4 QH
Introduces students to important technical fundamentals as applied to chemical process safety. Demonstrates good chemical process safety practice through chemical plant trips, visiting experts, and video presentations. *Prereq. Senior standing.*

CHE 1530 Biochemical Engineering Fundamentals 4 QH
Presents key concepts in biochemistry, cell biology, enzyme kinetics, and metabolic pathways, offered as an introductory exposure to these topics and not as complete coverage of life science fundamentals. Topics include biological reactor kinetics and design, transport phenomena in bioprocess systems, and process instrumentation/control. *Prereq. Senior standing.*

CHE 1777 Honors Adjunct 1 QH
To be added to any 4 QH course in the department when approved by the Honors Committee of The College of Engineering. Once approved, the adjunct information is forwarded to the Honors Office for dissemination to the honors membership. Students may enroll in CHE 1777 an unlimited number of times as it can be adjunct to any chemical engineering course.

CHE 1796 Honors Project 1 4 QH
Provides an opportunity for students to formulate and execute an analytical or experimental project under the guidance of a faculty member. Open only to students in the honors program. *Prereq. Permission of department.*

CHE 1797 Honors Project 2 4 QH
Continues CHE 1796. *Prereq. CHE 1796.*

Civil Engineering

CIV 1210 Structural Mechanics 1 4 QH
Topics include statics of particles and rigid bodies in two and three dimensions; analysis of internal forces in trusses and beams; centroids and centers of gravity of lines, area, and volumes; and moments of inertia of areas and masses. *Prereq. MTH 1223 taken concurrently and PHY 1222.*

CIV 1211 Structural Mechanics 2 4 QH
Surveys analysis of stress and strain; mechanical properties of materials; elastic analysis of stresses and deformations of members subject to axial load, torsion, shear, and moment. Introduces column behavior. *Prereq. CIV 1210.*

CIV 1220 Structural Analysis 1 4 QH
Reviews reactions, shear and bending moment diagrams, bar forces in trusses, deflections by virtual work, and moment area methods. Analyzes indeterminate structures by consistent deformations, slope deflection, and moment distribution. *Prereq. CIV 1211.*

CIV 1222 Structural Analysis 2 4 QH

Focuses on matrix analysis of indeterminate structures using both flexibility and stiffness approaches. Examines computer applications to analysis of framed structures. *Prereq.* CIV 1220.

CIV 1226 Structural Analysis and Design Laboratory 2 QH

Uses lectures, experimental studies, computation labs, and computer projects to develop students' knowledge of structural behavior and understanding of the design and analysis of structures. *Prereq.* CIV 1220 taken concurrently.

CIV 1240 Design of Reinforced Concrete Structures 1 4 QH

Reviews mechanical properties of steel and concrete. Studies behavior and design of reinforced concrete beams for shear, moment, and bond; and design of stocky columns for axial load and moment. Emphasizes strength design. *Prereq.* CIV 1220.

CIV 1241 Design of Reinforced Concrete Structures 2 4 QH

Topics include design of slender columns, foundations, and multi-story buildings with one-way and two-way floor systems. *Prereq.* CIV 1240.

CIV 1250 Design of Steel Structures 1 4 QH

Focuses on design of steel members subject to tension, compression, bending, and combinations of loading; and design of connections, braced frames, and rigid frames. *Prereq.* CIV 1220.

CIV 1295 Structural Design Projects 4 QH

Capstone structural design course. Consists of a minimum of two projects that consider environmental, social, and economic impact. Discusses the safety requirements of various government agencies. Projects require identification of design loading, assessment of structural stability, material usage, and the reliability of the proposed design. Employs computer-aided designs and verifies the results by approximate methods. Considers and analyzes economics of alternative designs. *Prereq.* CIV 1222, CIV 1241, and senior standing.

CIV 1310 Fluid Mechanics 4 QH

Introduces both the statics and dynamics of fluid mechanics. Topics include properties of fluids; pressure variation in water and air; pressure force on surfaces and submerged bodies, continuity, momentum, and energy principles; dimensional analysis and hydraulic similitude; flow in closed conduits, frictional and local losses in pipes and systems; and problems in steady flow. *Prereq.* CIV 1210.

CIV 1320 Hydraulic Engineering 4 QH

Covers a variety of topics including pipe networks; water hammer; pumps and pump selection; pipe/pump combinations; flow in open channels, uniform flow, gradually varied flow, and hydraulic jump; drag forces on bodies; principles of hydrology, unit hydrograph, and rainfall-runoff relationships; and some aspects of ground water and well hydraulics. *Prereq.* CIV 1310.

CIV 1340 Environmental Engineering 1 4 QH

Focuses on protection and management of the environment. Topics include assessment of environmental quality; introduction to water and wastewater technology; air pollution control; and solid waste management. *Prereq.* CHM 1132.

CIV 1341 Environmental Engineering 2 4 QH

Concentrates on development of fundamental physical, chemical, and biological phenomena of water and wastewater systems with

engineering applications in water technology from source to ultimate disposal. *Prereq.* CIV 1310 and CIV 1340.

CIV 1350 Environmental and Hydraulics Laboratory 4 QH

Presents lectures, labs, and field experiments in environmental and hydraulic engineering. Experiments in hydraulics include fluid properties; hydrostatics; drag forces; and flow in pipes, channels, pumps, and turbines. Environmental experiments include physical, chemical, and biological analyses normally used by environmental engineers. Field experiments are coordinated to allow collection of environmental and hydraulic data concurrently. *Prereq.* CIV 1320 taken concurrently and CIV 1340.

CIV 1370 Air Pollution 4 QH

Focuses on theory and practice related to engineering management of air resources. Surveys microclimate and dispersion of pollutants; atmospheric chemistry; air pollution instrumentation; control of gaseous and particulate emissions; design of air pollution control systems; and biological and chemical aspects of air pollution with emphasis on the toxicological aspects of the environment. Other topics include the physiological effects of aerosols; analysis of organic and inorganic constituents of the atmosphere; and rationale for establishment of air quality criteria and standards. *Prereq.* senior standing.

CIV 1395 Environmental Design Projects 4 QH

Capstone design course in the field of environmental engineering. Up to six individual design projects are assigned, typically involving water and/or waste treatment, site development, industrial waste handling, chemical treatment, and the modification of existing facilities. Each is given a careful critique. Designs require input relating to environmental protection and impact, economic factors, engineering feasibility, selection from alternatives, and safety consideration. One project requires an oral presentation. *Prereq.* CIV 1320, CIV 1341, CIV 1350, and senior standing.

CIV 1410 Soil Mechanics 4 QH

Studies soil classification, soil-water phase relations, ground water seepage, consolidation theory, strength properties of soils, stress distributions in soils due to surface loads, and slope stability. *Prereq.* CIV 1211 and CIV 1310.

CIV 1411 Soil Mechanics Laboratory 2 QH

Focuses on lab exercises, including soil classification, seepage, shear strength, consolidation, and triaxial testing. *Prereq.* CIV 1410 taken concurrently.

CIV 1420 Foundation Engineering 4 QH

Topics include subsurface explorations, determination of soil-bearing capacity, design of shallow foundations, pile and caisson foundations, design of retaining walls, anchored bulkheads and braced sheeting, and other selected topics on foundation design and construction. *Prereq.* CIV 1410.

CIV 1430 Geotechnology 4 QH

Introduces the geological sciences as they apply to civil engineering practice. Focuses on the effects of significant geological features on location, design, construction, operation, and maintenance of engineering projects. *Prereq.* Juniors and seniors only.

CIV 1495 Geotechnical Design Projects 4 QH

Capstone design course for those interested in the geotechnical area. Two or more projects involving the various aspects of

analysis and design used in geotechnical practice. Requires evaluation of subsurface conditions, identification of critical issues, assessment of environmental impacts, economics, safety, construction sequencing, and construction feasibility. They may also include structural design. Examples include design of foundations for super-structures, temporary earth retaining systems for deep excavations, and permanent earth support walls for deep earthen cuts. *Prereq. CIV 1420, CIV 1550, and senior standing.*

CIV 1510 Materials 4 QH

Focuses on the structural, chemical, and mechanical properties of materials of importance to civil engineers. Topics include fundamental nature of matter; significance of phase transformations; control of microstructure; and the mechanisms of failure of materials. *Prereq. CHM 1132.*

CIV 1511 Materials Laboratory 2 QH

A lab in which standard tests and equipment are used to determine structural and mechanical properties of materials common to civil engineering practice: concrete, aggregates, steel, wood, asphalt, glass, and others. *Prereq. CIV 1510 taken concurrently.*

CIV 1530 Transportation Analysis and Planning 4 QH

Covers history and policy issues in urban transportation: characteristics of different urban transportation models; fundamentals of bus and rail transit operations planning; fundamentals of urban highway operation; transportation systems management; and land use and demand modeling. Other topics include environmental impact assessment, citizen participation, data collection, and transportation in developing countries. *Prereq. Junior standing or above.*

CIV 1540 Highway Engineering 4 QH

Introduces highway engineering. Topics include administration, economic factors, planning, environmental impacts, geometric design, drainage, and the design of flexible pavements. *Prereq. CIV 1410 and CIV 1620.*

CIV 1550 Construction Management 4 QH

Surveys the construction industry and tasks that must be addressed by construction management, including resource allocation, construction environment, organization, contracts, funding, cash flow, productivity, labor relations, network planning and scheduling, construction accounting, and project control. *Prereq. Senior standing.*

CIV 1595 Transportation Design Projects 4 QH

Capstone design course in transportation. Involves planning/design of modified transportation facilities and services. Topics include demand estimation, highway design, traffic flow, safety, economic and social considerations, environmental impacts, and transit fleet size requirements. Examples of such projects are planning for a new highway, transportation systems management planning for an existing corridor, and design of an intermodal transfer facility. *Prereq. CIV 1530, CIV 1540, CIV 1630, CIV 1640, and senior standing.*

CIV 1620 Engineering Measurements 4 QH

Considers the mathematics and instrumentation used in land surveying for obtaining measurements of distance, elevation, and direction. Covers the methodology applied for traverses, areas, coordinate systems, horizontal and vertical curves, earthwork, and topographic mapping. *Prereq. MTH 1124 and PHY 1222.*

CIV 1621 Engineering Measurements Laboratory 2 QH

Examines field problems illustrating and applying the lecture material in CIV 1620, with computer applications. Taken simultaneously with CIV 1620. *Prereq. GE 1100.*

CIV 1625 Civil Engineering Computations Laboratory 1 QH

Allows students to design and execute applications programs for materials covered in CIV 1640 and other courses for a wide variety of civil engineering problems. Investigates some new civil engineering applications topics. *Prereq. CIV 1640 taken concurrently and GE 1100.*

CIV 1630 Civil Engineering Systems 4 QH

Covers application of system synthesis and optimization techniques: calculus method, linear programming, network analysis, and dynamic programming. *Prereq. MTH 1223.*

CIV 1640 Applied Probability Theory for Civil Engineers 4 QH

Covers applications of probability theory to civil engineering problems, probabilities of events, random variables and distributions, derived distributions, expectation, common probability models, and an introduction to statistics. *Prereq. MTH 1223.*

CIV 1650 Legal Aspects of Civil Engineering 4 QH

Introduces business law for engineering organizations, including description and evaluation of various types of contracts for engineering services and construction, procedures for submitting bids, procedures for claims, and legal steps to minimize risk exposure, both in United States and international business. *Prereq. Senior standing.*

CIV 1665 Professional Issues for Civil Engineers 1 QH

Focuses on concepts and theories of classical and contemporary ethics, moral development theories, and developing and applying professional ethics in engineering. Traces the development and philosophies of professional engineering societies. Covers the requirements and responsibilities of professional registration.

CIV 1777 Honors Adjunct 1 QH

To be added to any 4 QH course in the department when approved by the Honors Committee of the College of Engineering. Once approved, the adjunct information is forwarded to the honors office for dissemination to the honors membership. Students may enroll in CIV 1777 an unlimited number of times as it can be adjunct to any civil engineering course.

CIV 1796 Independent Study/Research 1 (Honors) 4 QH

Involves an analytical or experimental project under the supervision of a department faculty member. Before the end of the first week of the quarter, each student must obtain written approval for a proposed project from the faculty supervisor and from the department. A formal report must be submitted to the faculty supervisor at the end of the quarter. *Prereq. Junior or senior standing in the honors program.*

CIV 1797 Independent Study/Research 2 (Honors) 4 QH

Continues CIV 1796, or a new project following the guidelines of CIV 1796. *Prereq. CIV 1796.*

CIV 1810 Special Topic in Civil Engineering 4 QH

This is a special course within the field of civil engineering initiated by the appropriate discipline committee and approved by the department. *Prereq. Permission of instructor.*

CIV 1820 Special Project in Civil Engineering**4 QH**

Offers individual study in an area within the field of civil engineering, selected by the student and his or her instructor with approval by the appropriate discipline committee, resulting in a definitive report and an oral presentation. *Prereq.* Outstanding academic performance.

Electrical Engineering**ECE 1171 Electrical Engineering 1****4 QH**

Introduces electric circuit theory. Covers Kirchhoff's laws, loop and nodal analysis, Thevenin's theorem, power and energy, exponential excitation, and the system function. *Prereq.* MTH 1125; not open to electrical engineering majors.

ECE 1178 Digital Electronics

Introduces electronic digital circuits. Covers Kirchhoff's Laws, single-time constant systems, semiconductors, MOS and bipolar transistor operation, and their application in basic logic-gate families. Also includes Karnaugh maps and gate arrays. *Not open to electrical engineering majors.*

ECE 1215 Circuits and Systems 1**4 QH**

Examines basic concepts of electric circuits including current, voltage, power, and energy. Covers Kirchhoff's and Ohm's laws, and analyzes electric circuits composed of resistors and controlled sources. Studies node and mesh analysis, network topology, graphs and trees, and selecting independent loop equations. Covers linearity and superposition, Thevenin and Norton theorems, and maximum power transfer. *Prereq.* MTH 1125 and PHY 1223.

ECE 1216 Circuits and Systems 2**4 QH**

Discusses inductors and capacitors, transient analysis by differential equations, the sinusoidal steady state, representation by complex exponentials, phasors, impedance and admittance, complex power and power factor, coupled coils and transformers, and three-phase circuits. *Prereq.* ECE 1215 and MTH 1125.

ECE 1217 Circuits and Systems 3**4 QH**

Covers complex frequency and generalized frequency response, phase and amplitude response, Bode diagrams, network functions and two-port approach, and treatment of signals in the frequency domain (Fourier series) and in the time domain (impulse response and convolution). Studies applying Laplace transform in circuit analysis. *Prereq.* ECE 1216 and MTH 1225.

ECE 1221 Measurements Laboratory**1 QH**

Covers fundamentals of electrical measurements and instrumentation. Topics include electrical characteristics of meter movement and its use in designing ammeters and voltmeters; sources of DC current and voltage and their characteristics; the oscilloscope and its application to the display of waveforms and I-V curves of the two-terminal devices; and the measurements of amplitude, phase, and time interval. Lab fee. *Prereq.* ECE 1215 taken concurrently.

ECE 1222 Circuits Laboratory 1**1 QH**

Offers experiments in basic circuits and measurement. Topics include AC waveforms and circuits for the measurement of peak, average, and rms values; network theorems, that is, Thevenin and

Norton, their application and experimental verification; and null circuits such as the Wheatstone bridge and potentiometer. Discusses characterization of simple LTI circuits including RL, EC, and RLC by investigation of their step response and impulse response. Lab fee. *Prereq.* ECE 1216 taken concurrently.

ECE 1223 Circuits Laboratory 2**1 QH**

Lab experiments include controlled sources sinusoidal excitation of first order RC and second order RLC networks; the determination by measurement of magnitude and phase (Bode) plots; and investigation of the resonance phenomenon. Lab fee. *Prereq.* ECE 1217 taken concurrently.

ECE 1224 Electronics Laboratory 1**1 QH**

Follows from ECE 1346. Experiments include p-n junctions and diodes, regulation and power supplies, transistor biasing and bias stability, and MOS digital circuits. *Prereq.* ECE 1346, and ECE 1347 taken concurrently.

ECE 1225 Electronics Laboratory 2**1 QH**

Follows from ECE 1347. Experiments with designing and verifying basic analog circuit functions utilized in integrated circuits. Advantages inherent to ICs, such as component matching and tracking, are exploited in the circuit building blocks investigated. Studies output power stages, current sources, amplifying stages, and differential amplifiers. Topics include applications to signal amplification, D-to-A conversion, and the extraction of weak signals buried in interference. Lab fee. *Prereq.* ECE 1347, and ECE 1349 taken concurrently.

ECE 1226 Discrete Systems Laboratory**1 QH**

Utilizes a personal computer to study and explore various aspects of A/D and D/A conversion such as aliasing and quantization and some aspects of discrete Fourier transforms and digital filters. Lab fee. *Prereq.* ECE 1333 taken concurrently.

ECE 1227 Electromagnetic Fields Laboratory 1**1 QH**

Lab designed to support class material related to microwave transmission and radiation. Experiments include microwave transmission line measurements and the determination of the properties of dielectric materials; transmission line length measurement; reflection and impedance measurement of dipole antenna; frequency characteristics of antennas and waveguides; and mutual coupling and radiation pattern determination. Lab fee. *Prereq.* ECE 1364 taken concurrently.

ECE 1228 Electromagnetic Fields and Energy Conservation Laboratory 2**1 QH**

Presents static and quasi-static (low frequency) applications of electromagnetic fields and electromechanical energy conversion. Experiments in electromagnetic fields include measurement of static electric potentials in electrode structures and numerical solution of Laplace's equation and static magnetic field measurements of coil configurations. Experiments in energy conversion include transformers and induction motors. Investigates hysteresis, transformer and motional emfs, and development of electromagnetic torque. Lab fee. *Prereq.* ECE 1365 taken concurrently.

ECE 1229 Digital Systems Laboratory**1 QH**

Introduces some aspects of computer hardware design encountered at the digital logic level. Discusses both combinational logic and sequential logic units. Focuses on MSI devices including multiplexers, decoders, counters, shift registers, PROM, RAM, and ALU. Demonstrates the design of Mealy and Moore sequence

detectors and other digital subsystems such as parallel binary divider. Lab fee. *Prereq.* ECE 1382 taken concurrently.

ECE 1230 VLSI System Design Laboratory **2 QH**

Examines the design, layout, and simulation of digital VLSI circuits using a comprehensive set of CAD tools. Studies layouts of NMOS and CMOS combinational and sequential circuits using either a layout editor or automatic layout generators. Studies functional structures including registers, adders, decoders, ROM, PLAs, counters, RAM, and ALU. Utilizes logic and circuit simulators for the logic verification and timing simulation of designed circuits. Lab fee. *Prereq.* ECE 1351 taken concurrently.

ECE 1231 Electric Power Laboratory 1 **1 QH**

Presents a power systems design project encompassing one or more of the following computer studies: transmission line constants, power flow, short circuits, and transient stability. Uses a personal computer to upgrade the design of a small power system. Lab fee. *Prereq.* ECE 1472 taken concurrently.

ECE 1232 Electric Power Laboratory 2 **2 QH**

Lab experiments cover topics in electromechanical energy conversion employing the "Faraday Law machine" bench. Studies Faraday's Law, transformers, reluctance and induction motors, and synchronous machines. Lab fee. *Prereq.* ECE 1472, and ECE 1371 taken concurrently.

ECE 1233 Semiconductor Processing Laboratory **2 QH**

Covers fabrication and testing of simple MOS integrated circuits. Compares process and device models introduced in ECE 1406 with experimental results during weekly lab sessions. Processing includes oxidation, diffusion, lithography, etching, metallization, and characterization. Fabricated diodes, MOS capacitors and transistors, and simple gates will be electrically characterized. Lab fee. *Prereq.* ECE 1406 taken concurrently.

ECE 1234 Digital Signal Processing Laboratory **2 QH**

Focuses on programming a digital signal processing chip in its native assembly language, and performing input/output operations via A-to-D and D-to-A converters. Studies real time signal processing operations and hardware aspects of DSP systems. Considers applications to digital frequency synthesis, computation of discrete time convolution, speech scrambling through frequency inversion, and design and implementation of both FIR and IIR digital filters. Lab fee. *Prereq.* ECE 1456 taken concurrently.

ECE 1235 Control Systems Laboratory **1 QH**

Familiarizes the student with the practical aspects of control systems design through lab experiments. Topics include analog computer simulation, digital computer control, and use of a programmable controller. Experiments with PID control of DC motor and computer implementation of feedback compensations. Lab fee. *Prereq.* ECE 1420 taken concurrently.

ECE 1332 Linear Systems 1 **4 QH**

Develops the basic theory of continuous linear systems. Discusses nonlinear no-memory systems, develops the time-domain theory of linear time-invariant systems with memory, analyzes convolution, causality, and stability in detail, and develops the bilateral Laplace transform to analyze time-invariant systems in the frequency domain. Discusses gain, phase-shift, and the stability of feedback systems. *Prereq.* ECE 1217 and MTH 1225.

ECE 1333 Linear Systems 2 **4 QH**

Develops the basic theory of linear discrete systems. Discusses the representation of discrete signals and analyzes continuous waveform sampling and quantization. Develops the theory of shift-invariant, linear systems. Discusses FIR and IIR systems, recursive analysis, convolution, causality, and stability in detail. Develops the discrete Fourier transform and the Z-transform and then analyzes discrete signals and systems in the frequency domain. *Prereq.* ECE 1332, and ECE 1226 taken concurrently.

ECE 1346 Electronics 1 **4 QH**

Emphasizes the use of solid-state active devices in digital circuits. Introduces binary values, logic operations, flip-flops, and registers from the viewpoint of symbolic logic gates, Boolean algebra and Karnaugh maps. Other topics include solid-state devices for the realization of logic functions; concepts of diodes; BJT and field-effect characteristics leading to the use of such devices in implementing inverters, NAND and NOR gates for T_L, CMOS and NMOS logic families. *Prereq.* ECE 1216.

ECE 1347 Electronics 2 **4 QH**

Emphasizes the use of transistors, including integrated devices in the design of analog circuits. Topics include biasing, linearized incremental model characteristics such as gain and impedance levels, early effect, use of signal flowgraphs and frequency response for single and compound stages, and an introduction to operational amplifiers. *Prereq.* ECE 1346, and ECE 1224 taken concurrently.

ECE 1349 Electronic Design 1 **4 QH**

Studies the design of analog circuits with emphasis on operational amplifiers. Topics include concepts of feedback, open- and closed-loop gain, effect of feedback on impedance levels, frequency response, and stability and compensation in feedback systems. Introduces ECL from the viewpoint of feedback, followed by an analog/digital design example. *Prereq.* ECE 1347, and ECE 1225 taken concurrently.

ECE 1350 Electronic Design 2 **4 QH**

Continues ECE 1349. Emphasizes the design of systems involving analog, digital and analog/digital approaches to signal acquisition and processing. *Prereq.* ECE 1349.

ECE 1351 Special Topics in IC Design **4 QH**

Offers a structured digital MOS design course in designing, verifying, and fabricating both NMOS and CMOS VLSI integrated circuits. Introduces required design rules and relates them to the fabrication process. Begins design exercises and tutorials with basic inverters and proceeds to the design, verification, and performance of large complex digital logic networks. Develops a simple RD delay model in conjunction with the theory of delays in VLSI systems. Other topics include program logic arrays and automatic design tools, shift registers, arithmetic logic units, and memory systems. *Prereq.* ECE 1382, and ECE 1230 taken concurrently.

ECE 1363 Electromagnetic Field Theory 1 **4 QH**

Starting with Maxwell's equations, studies the major areas of statics, dynamics, quasi-statics, and material media. Statics covers the study of the electrostatic and magnetostatic fields, including the scalar electric potential and vector magnetic potential. In dynamics, presents Faraday's law and Ampere's law for time-varying electromagnetic fields. Quasi-statics introduces the

concept of electromechanical coupling with applications to elementary energy conversion, both electric and magnetic devices. Material media covers the macroscopic model of dielectric materials; the electric polarization and the electric flux density vector; macroscopic model of magnetic materials, magnetization, and magnetic field intensity; and boundary conditions. *Prereq.* MTH 1223, MTH 1225, and PHY 1224.

ECE 1364 Electromagnetic Field Theory 2 **4 QH**

Introduces the applications of electromagnetic field theory. Based on Maxwell's equations for time-varying fields, develops the following areas: waves and energy, including plan wave propagation, waveguides and Poynting's theorem; radiation, with emphasis on spherical waves and elementary scattering and application to antenna design; distributed systems terms of waveguide circuit concepts, transmission lines, and Smith chart techniques. Presents other applications in the optics and acoustics areas. *Prereq.* ECE 1363, and ECE 1227 taken concurrently.

ECE 1365 Electromagnetic Fields and Energy Conversion **4 QH**

Focuses on the static and quasi-static solution of the electromagnetic field equations and emphasizes energy conversion and transducers. Topics include magnetostatics; magnetic materials and transducers; and magnetic circuits, transformers, and energy conversion concepts applied to DC, synchronous, and induction machines. *Prereq.* ECE 1364, and ECE 1228 taken concurrently.

ECE 1371 Electrical Machines 1 **4 QH**

Reviews electromagnetic field theory as applied to electromechanics. Discusses magnetic circuits, transformers, and their circuit representations; principles of electromechanical energy conversion (state-variable formulation of electromechanical coupling, singly and multiply excited magnetic-field systems; elementary concepts of rotating machines including transformer emf, speed emf, and torque production); steady-state theory and performance of basic rotating machines such as induction, synchronous, and DC commutator machines through circuit-model concepts. *Prereq.* ECE 1365, and ECE 1232 taken concurrently.

ECE 1372 Electrical Machines 2 **4 QH**

Covers dynamic behavior of electromechanical devices; transient performance of synchronous machines; synchronous and induction-machine dynamics; and DC machine dynamics. *Prereq.* ECE 1371.

ECE 1379 Transients in Electric Power Systems **4 QH**

Introduces transient response in electrical power systems. Topics include lightning; switching; faults; and protection against transient overvoltages. Considers transmission lines, transformers, circuit breakers, surge arresters, and fuses in terms of transient response. *Prereq.* ECE 1333.

ECE 1381 Computer Engineering 1: Introduction to Computer Architecture **4 QH**

Presents a view of the architecture of a modern computer; the visible architecture provides the starting point. Uses assembly language programming to develop a foundation on the hardware which executes a program and shows what a compiler, assembler, and linker do and how they interact with the architecture. Explores data structures from a programmatic perspective (static storage, stack, and heap) and from a high-level language perspective (simple data types, and structured data types). Covers several types of computer number systems and arithmetic (2s-complement, IEEE floating point, and logical operations). Includes numerous programming exercises and a software design project

to develop working facility with the tools and concepts that underlie the next three computer engineering courses. *Prereq.* GE 1100 or equiv.

ECE 1382 Computer Engineering 2: Design of Digital Logic Machines and Circuits **4 QH**

Continues ECE 1381 with a bottom-up view of the design of logic machines, leading to the design of a simple digital computer by the end of the quarter. Covers Boolean switching algebra and gate-count minimization; combinational design; sequential circuits; state machines; PLA, PAL, and ROM realizations; CPU design, design of the ALU, and control unit design. Introduces CAD logic design tools. Requires a design project using SSI and MSI chips to develop facility in the design and testing of functional digital circuits. Proof of the circuit will be done using the CAD tools. *Prereq.* ECE 1381, and ECE 1229 taken concurrently.

ECE 1383 Computer Engineering 3: Microprocessor-Based Design **4 QH**

Focuses on the hardware design for modern microprocessor systems. Topics include microprocessor systems architecture; HP64000 microprocessor development system; support circuits; microprocessor busses; electrical characteristics and buffering; memory systems, memory maps, and address decoding; timing in microprocessor systems; asynchronous and synchronous bus protocols; and troubleshooting microprocessor systems. Covers I/O-port design and interfacing using VLSI devices; parallel and serial ports; communication protocols and synchronisation to external devices; hardware and software handshake; serial communication protocols; and RS 232C, RS 422, and RS 423 serial interface standards. Investigates exception processing and interrupt handlers, interrupt generation, interfacing, and vectoring. Includes comprehensive lab exercises that let groups of three students build a modern microprocessor system and execute a small project that enhances the system with useful hardware or software. *Prereq.* ECE 1382.

ECE 1384 Computer Engineering 4: Hardware and Software for Microprocessor Interfaces **4 QH**

Focuses on the interaction of software and hardware necessary to interface microprocessor systems to the real world. Topics include special-purpose I/O devices; timers; D/A and A/D converters; DMA controllers, and disk controllers. Surveys bus design and bus protocols: VME bus, IEEE-488 (GPIB) instrument bus, small computer system interface (SCSI) bus. Analyzes real-time programming: I/O techniques, event-handling delays, and data throughput rates. Considers BIOS, monitors, simple operating systems, multitasking, and memory management. Most of the course is taught in the context of one modern microprocessor, but other microprocessors will also be discussed. Includes several lab exercises and a project implementing hardware and software for a complex microprocessor interface. *Prereq.* ECE 1383.

ECE 1385 Computer Engineering 5: Introduction to Robotics **4 QH**

Studies intelligent interactions between machines and their environment with emphasis on sensory (vision)-driven locomotion and manipulation. Examines integration of sensors, manipulators, and computers into intelligent robotic systems. Demonstrates vision, touch, force, position, proximity, and torque sensors and their role in adaptive control of robot movements. Other topics include computational needs of sensory data processing; VLSI implementation of data-driven architectures for low-level vision; image processing and understanding as a means of developing symbolic models of the visual (sensory) world; manipulator kinematics and dynamics; VLSI controllers for multicoordinate robotic systems; robotic software tools, including high-level language

and decision-making functions; and real-time microprocessor networks and control hierarchies within the robot. *Prereq.* ECE 1333, ECE 1382, and ECE 1383.

ECE 1386 Computer Engineering 6: Structure of Large-Scale Computer Systems 4 QH

Studies large-scale computer systems with applications to robotics, communications, artificial intelligence, and interactive computer design. Covers a global overview of distributed and parallel computing systems for problem solving, planning, and massive data processing. Examines special purpose processors that constitute such complex systems including parallel hardware for image processing, industrial data acquisition and control systems, array processors, and knowledge-based systems. *Prereq.* ECE 1384.

ECE 1390 Senior Project Laboratory 1 2 QH

In this course, students work with a faculty adviser on a term project, either experimental or theoretical. *Prereq.* Permission of department.

ECE 1391 Senior Project Laboratory 2 2 QH

Continues the project started in ECE 1390 or it may be a new project. *Prereq.* Permission of department.

ECE 1400 Special Topics 4 QH

Topics covered vary from term to term depending on the interests of the department and the students. *Prereq.* Permission of department.

ECE 1401 Selected Topics In Electronics 4 QH

Covers the description and application of those electronic devices (thyristors, photodiodes) not covered in depth in the regular electronics sequence; electronic subsystems (AFC, shift registers); and systems (navigation systems, telephone switching systems). Most of the presentations are chosen and made by students, but there are also lectures by invited speakers by the instructor. *Prereq.* ECE 1347.

ECE 1406 Integrated Circuit Fabrication 4 QH

Surveys integrated circuit fabrication from crystal growth to chip interconnection and packaging. Discusses fabrication and device theory in the classroom, closely tying these to the concurrent fabricating and testing of MOS-integrated circuits in the laboratory (ECE 1233). Covers the major processes used in all integrated circuit fabrication including lithography, film deposition, diffusion, ion implantation, and silicon oxidation. Discusses the p-n junction diode, the diode equation, MOS capacitors and transistors, and VLSI fabrication processes (NMOS, CMOS, and bipolar). *Prereq.* ECE 1347, and ECE 1233 taken concurrently.

ECE 1408 Physical Electronics 4 QH

Develops elements of solid-state theory including wave mechanics, crystalline and amorphous solids, statistical mechanics, and electron transport theory to provide background for a thorough understanding of the junction diode. Explores ohmic contacts and Schottky barriers and the ways that these may be generated in individual and integrated form. Demonstrates how these elements are joined together to form BJTs and JFETs. *Prereq.* ECE 1347.

ECE 1420 Control Systems 4 QH

Comprises closely coupled lectures and laboratory experiments. Topics covered include control system concepts, basic components and goals, modeling and mathematical description, transfer

function and state variable representations, feedback control system characteristics, system responses, stability of feedback systems, analysis of graphical tools such as root-locus and Nyquist diagram, compensator design based on root-locus and frequency response, and modern control system design. *Prereq.* ECE 1332 and ECE 1347, and ECE 1235 taken concurrently.

ECE 1454 Communication Systems 4 QH

Presents fundamentals of digital and analog communication systems with emphasis on digital communication schemes. Topics covered include random processes and noise characteristics, information sources and source coding, analog communication systems, transmission of digital data through AWGN channels, transmission of digital data through bandwidth constrained channels, digital carrier modulation schemes, channel capacity, and coding. *Prereq.* ECE 1333 and MTH 1384.

ECE 1456 Digital Signal Processing 4 QH

Introduces modern signal processing. Reviews discrete signals and systems; realization structures for digital filters, including direct forms, cascade forms, and parallel forms; digital filter design, including IIR filter design using impulse invariance and bilinear transformation; and FIR filter design using windowing and frequency sampling. Covers fast Fourier transforms; decimation-in-time and decimation-infrequency; applications to fast convolution; and implementation of DSP algorithms, including special purpose hardware to applications in speech processing and spectral estimation. *Prereq.* ECE 1333, and ECE 1234 taken concurrently.

ECE 1458 Communication Networks 4 QH

Uses open systems interconnection (OSI) model as a framework for discussing design principles, management of complexity, standardized connectivity, and routing switching and multiplexing techniques used in networks to achieve connectivity and resource sharing. Topics include broadband integrated services digital networks (B-ISDN), personal communication networks (PCN), and techniques for modeling and evaluating network performance by analytical methods, simulations, or emulations.

ECE 1462 Advanced Topics in Electromagnetic Field Theory 4 QH

Continues the required courses in field theory. Topics include microwave and waveguide structures; careful development of electromagnetic energy and force concepts; and an introduction to radiation and antenna theory. *Prereq.* ECE 1364.

ECE 1465 Wave Transmission and Reception 4 QH

Discusses the transmission, radiation, and reception of electromagnetic waves at and above radio frequencies. Develops transmission-line theory using circuit theory approximations. Discusses matched lines, tuning stubs, and loaded transmission lines, together with the theory and applications of the Smith chart. Other topics include the linear antenna, radiation fields, directivity, gain, the aperture antenna, and the insulated antenna. *Prereq.* ECE 1364.

ECE 1466 Optics of Photon Devices 4 QH

Presents the basic optical concepts necessary for an understanding of quantum electronic devices. Analyzes the simple Lorentzian model of the interaction between electromagnetic waves and optical materials, modified to include necessary quantum concepts. Topics include propagation of electromagnetic waves in isotropic and nonisotropic media (crystal optics); reflection and refraction, polarization and double refraction; optical resonance

and stability criteria; Gaussian beam propagation; systems with gain; coherent and noncoherent optical sources; and detection of optical signals. Considers specific devices including resonators, amplifiers, and oscillators; modulators and switches; and optical detectors. *Prereq.* ECE 1364.

ECE 1471 Electrical Power Systems 1 **4 QH**

Introduces electrical power systems, wherein three-phase circuits are analyzed under balanced steady-state operation. Topics include system elements and their characteristics and interaction, system modeling, network calculations, and an introduction to symmetrical components. *Prereq.* ECE 1332.

ECE 1472 Electrical Power Systems 2 **4 QH**

Continues basic studies in electrical power systems. Topics include power system load-flow analysis, symmetrical components and fault calculations, system protection, economic operation of power systems, and an introduction to power system stability. *Prereq.* ECE 1471, and ECE 1231 taken concurrently.

ECE 1474 Power Electronics **4 QH**

Presents the application of electronics to energy conversion and control. Studies phase-controlled rectifier circuits, DC-DC converters, high frequency inverters, and motion control systems. Examines power semiconductor devices: diode, bipolar and field effect transistors, and thyristors. Illustrates modeling, analysis and control techniques on numerous examples. *Prereq.* ECE 1347 and ECE 1365.

ECE 1481 Machine Language and Assembly Language Programming **4 QH**

Focuses on study of the machine and assembly languages of a selected digital computer. Covers machine representation of numbers, characters, and instructions; machine language programming: flow of control, relocatability, input/output instructions, addressing, and instruction modification. Traces symbolic assembly language: macros, literals, and pseudo-instructions. Includes several programming projects. *Prereq.* ECE 1381.

ECE 1482 Programming Systems **4 QH**

Continues ECE 1481. Discusses assemblers, searching and sorting techniques, and macroprocessors loaders. Introduces high-level languages and their compilation, and operating systems. Includes programming projects as an integral part of the course. *Prereq.* ECE 1481.

ECE 1484 Applied Discrete Analysis **4 QH**

Introduces elementary number theory, modern algebra, combinatorial mathematics and discrete probability theory, including prime numbers, least common multiple, and greatest common divisor. Covers Euclid's algorithm, continued fractions, congruences, groups, rings, fields, Boolean algebra, combinations and permutations, generating functions, random variables, and Markov chains. *Prereq.* MTH 1225.

ECE 1486 Numerical Methods and Computer Applications **4 QH**

Presents numerical techniques used in solving scientific and engineering problems with the aid of digital computers. Topics include modeling and simulating of deterministic and probabilistic systems; theory of interpolation; iteration methods; numerical solution of ordinary and partial differential equations; signal detection; and use libraries of scientific subroutines. Chooses representative problems for solution on a digital computer. *Prereq.* MTH 1225 and GE 1100.

General Engineering

The course descriptions listed under general engineering are intended to show the scope of the subject that will be covered. Since courses are continually updated, specific topics or methods of approach may vary from term to term.

GE 1100 Computers for Engineers **4 QH**

Uses computers to solve engineering problems emphasizing "structured programming" and Pascal. Explores methods of forming and testing an algorithm; introduces software design methods, forming a subprogram and communicating with a subprogram. Topics include establishing and manipulating tables, arrays and matrices, demonstrating how to use a typical numerical methods package—the Turbo Toolbox—to solve advanced engineering problems.

GE 1110 Engineering Graphics and Design **4 QH**

Focuses on three-dimensional visualization skills and the engineering design process. Includes topics in visualization such as computer-aided design (CAD), principles of orthographic projection, sectioning, auxiliary views, dimensioning, size and form tolerancing, fasteners, pictorials, and sketching. Includes topics in engineering design such as the design process, problem formulation, creativity techniques, design analysis, product liability, patents, cost analysis, materials selection, fabrication processes, and report preparation. Requires the student to develop an original design solution to a technical problem as a term project and to use CAD software extensively.

GE 1700 Computers for Engineers (Honors) **4 QH**

Honors equivalent of GE 1100. *Designed for students with experience in Pascal programming.*

Industrial Engineering and Information Systems

IIS 1200 Work Design **4 QH**

Topics include the engineering design process, principles of work physiology, and workplace design from the standpoint of employee safety and effectiveness. Covers work measurement techniques, including direct measurement, synthetic standards, and work sampling. Includes a project in which principles of work design must be applied.

IIS 1300 Probabilistic Analysis for Engineers **4 QH**

Presents axiomatic foundations of probability, emphasizing engineering application. Includes topics such as sample space, event, random variable, and probability distribution of standard discrete and continuous random variables (binomial, geometric, Poisson, normal, T, and exponential). Covers multivariate distributions, expectation, parameter estimation, and function of random variables. *Prereq.* Integral and differential calculus.

IIS 1310 Statistics **4 QH**

Reviews normal and its sampling distributions, including T, Chi-square, and F. Includes topics such as interval estimation, hypothesis tests of means and variances, goodness-of-fit test, and regression analysis. *Prereq.* IIS 1300.

IIS 1330 Principles of Computation and Programming 1**4 QH**

Reviews algorithms, computers, and programming; machine language programming (instruction, execution, and addressing techniques); coding and representation of data; program debugging and verification. Surveys machines, devices, and languages.

Prereq. Higher-level language.

IIS 1340 Operations Research 1**4 QH**

Topics include deterministic models, including LP and duality; transportation and allocation; sensitivity and post-optimality analyses; and network analysis, including maximal flow, shortest route, and PERT. *Prereq.* MTH 1223.

IIS 1341 Operations Research 2**4 QH**

Focuses on the stochastic models in operations research and their analytical development and solution. Topics include queuing models, deterministic and stochastic inventory models, Markov chains, and sequencing. Presents dynamic programming and recursive functional expressions. *Prereq.* IIS 1310.

IIS 1345 Management Information Systems**4 QH**

Examines the design and implementation of computer-based information systems. Topics include the value of information; tools of system analysis and design; impact of computer-based information systems on organizations and society; rudimentary computer architecture; input devices; data organization and storage; system configuration; communications; and output/display devices.

IIS 1350 Digital Simulation Techniques**4 QH**

Covers model design and development, validation, and experimentation for discrete event simulation models. Topics include problem formulation, data collection and analysis, random variable generation, and statistical analysis of output. Utilizes a major simulation language such as GPSS, SIMAN, or SIMSCRIPT.

Prereq. Higher-level language and IIS 1310.

IIS 1360 Engineering Economy**4 QH**

Familiarizes the student with the theory and techniques of economic design and evaluation of an investment project. Presents introductory steps in the analysis of investment proposals, time value of money, and cash flows. Analyzes cash flows in terms of present worth, annual cost, rate of return, and benefit/cost ratio. Studies decision tree for sequential decisions, value of information, effect of accounting procedures, and taxes on investment analysis.

IIS 1366 Engineering Economy**4 QH**

Topics include the formulation of analytical techniques, such as, rate of return, present worth, and annual cost. Considers the application of these techniques to solve business and engineering problems involving design, selection, replacement, lease-buy decisions, and decisions among multiple alternatives. Introduces sensitivity analysis and basic probability in cases where uncertainty exists. Surveys sources and costs of capital, debt-versus-equity financing, and leverage. *Not open to industrial engineering majors.*

IIS 1400 Systems**4 QH**

Examines modeling, analysis, and control of linear feedback systems through consideration of the following topics: differential equations as system models; transfer functions and block diagrams; system components and the method of analogies; accuracy, and stability. *Prereq.* MTH 1230.

IIS 1401 Design Project**4 QH**

Examines analysis and design of major industrial engineering systems. Students are expected to undertake up to five projects drawn from line balancing, job shop scheduling, stochastic network analysis, reliability in design, complex queuing system design, sequencing, or other areas of student and faculty interest. *Prereq.* IIS 1341, IIS 1350, IIS 1360, and IIS 1405.

IIS 1405 Production and Inventory Control**4 QH**

Explores design of basic inventory models and inventory management systems, single-stage and multi-stage systems and their dynamics, production control and aggregate planning, and mathematical and heuristic approaches to aggregate scheduling. Topics include cost structure and decision-oriented analyses, and consideration of job shop scheduling and dispatching problems. *Prereq.* IIS 1310 and IIS 1340.

IIS 1415 Facilities Design**4 QH**

Examines the use of descriptive and optimizing models (for example, simulation, queuing theory, and linear programming) to design facilities and associated materials-handling systems. Applies computerassisted layout analysis techniques to problems of real-world scope. *Prereq.* IIS 1340.

IIS 1425 Material Handling System Design**4 QH**

Discusses the design and analysis of large materialhandling systems. Topics include computer control of handling systems, integration with production and inspection, automated storage/retrieval systems, automatic identification systems, and systems acquisitions. *Prereq.* IIS 1340.

IIS 1436 Quality Assurance**4 QH**

Covers basic principles to state-of-the-art concepts and application of statistical process control and design. Applies principles to a variety of products. Topics include measuring and controlling product quality, Shewhart control charts, quality cost, pareto analysis, discrete and variable sampling, and military standards in quality control. *Prereq.* IIS 1310.

IIS 1450 Expert Systems**4 QH**

Introduces students to the theory, topics, and applications of expert systems in engineering. Topics include knowledge representations formats (production rules, frames, networks, and logic systems), heuristics in engineering (deterministic and nondeterministic), fuzzy logic, certainty factors, cognition, memory, decision strategies, design of expert systems, shells, current research goals, and applications in engineering. Each student must complete a design project in expert systems development and/or application. *Prereq.* GE 1100, IIS 1300, IIS 1330, or permission of instructor.

IIS 1466 Manufacturing Automation**4 QH**

Familiarizes students with the process of manufacturing and potential for automation. Studies designing for automation including required hardware and software. Involves hands-on experience with robotics programming and implementation, programmable control programming, and CNC machine programming using APT and G code. *Prereq.* IIS 1330 and IIS 1465, or permission of instructor.

IIS 1470 Human Considerations in Engineering Design**4 QH**

Introduces human factors with emphasis on the physiological and anthropometric bases of equipment and workplace design. Topics include an overview of the field of human factors; work, fatigue,

and endurance; thermal regulation and heat stress; biomechanics; effects of aging on work capacity; and body response to vibration.

IIS 1475 Human-Machine Systems 4 QH

Emphasizes human sensory/motor performance, information-processing capabilities, learning, and skilled-task performance. Topics include an introduction to the experiment as a source of knowledge of human performance characteristics; vision, visual performance, and principles of display design; audition, noise, hearing damage, and auditory signals; information processing; signal detection; aging effects; and system development.

IIS 1777 Honors Adjunct 1 QH

To be added to any 4 quarter hour course in the department when approved by the Honors Committee of the College of Engineering. Once approved, the adjunct information is forwarded to the Honors Office for dissemination to the honors membership. Students may enroll in IIS 1777 an unlimited number of times as it can be an adjunct to any industrial engineering course.

IIS 1800 Independent Study in Industrial Engineering 4 QH

Independent study on advanced IE topics for students usually in the senior year and with high scholastic standing. Projects may be of an applied or theoretical nature. A formal report is submitted to student's project supervisor at the end of quarter.

Mechanical Engineering

ME 1111 Key Ideas in Engineering 1 QH

Introduces first-year students to engineering as a creative practice. Discusses the relationship between engineering and science, and between engineering and economic activity. Explores the challenge, necessity, and satisfaction of lifelong learning in an engineering career.

ME 1201 Statics 5 QH

Examines vector representation of force and moment; equivalent force systems; centroids and centers of gravity; and distributed forces. Investigates equations of equilibrium; free-body diagrams; applications to trusses, pin-connected frames, and beams; shear and moment diagrams; and elementary concepts in friction. Introduces virtual work. *Prereq.* PHY 1222.

ME 1202 Dynamics 1 5 QH

Develops problem-solving ability in the fundamentals of dynamics. Topics include kinematics of particles, kinematics of rigid bodies, and mass moments of inertia. Examines kinetics of particles and rigid bodies using force, mass, and acceleration. *Prereq.* ME 1201.

ME 1203 Strength of Materials 1 5 QH

Explores the concept of stress and strain; state of stress and strain at a point; and stress-strain relations and material properties. Investigates moment of inertia of areas; stress and deformation of simple members under axial and torsional loads; and stresses in symmetrical beam bending. Involves lab sessions to support the lectures. *Prereq.* ME 1201.

ME 1314 Strength of Materials 2 4 QH

Topics include asymmetrical bending; analysis of determinate and indeterminate beams by various methods; and buckling of columns. *Prereq.* ME 1203.

ME 1315 Dynamics 2 4 QH

Continues development of problem-solving ability in dynamics. Topics include kinematics of rigid bodies using rotating frames, kinetics of particles and rigid bodies using work and energy, introduction of Lagrange's equations, kinetics of particles and rigid bodies using impulse and momentum, and simple gyroscopic motion. *Prereq.* ME 1202.

ME 1320 Dynamics for Civil Engineers 4 QH

Topics include kinematics, translating reference frames, mass moments of inertia, plane motion of rigid bodies, and instantaneous equations of motion. *Prereq.* CIV 1210.

ME 1321 Mechanics for Electrical Engineers 4 QH

Focuses on the study of the mechanics of rigid bodies, instantaneous equations of motion, work and energy, and impulse and momentum. *Prereq.* PHY 1222.

ME 1335 Mechanical Design 5 QH

Covers applications to the design process of the basic concepts of mechanics, strength of materials, and mechanical behavior of materials. Discusses basic considerations in design and its open-ended nature. Reviews fundamentals of stress and deflection analysis; theories of failure; design for fatigue strength; product liability; numerical methods in design, modeling, simulation; and optimization of mechanical systems. *Prereq.* ME 1314.

ME 1336 Design Project 1 5 QH

Applies the engineering sciences to the design of a system, component, or process. Students will choose the particular design project with the approval of appropriate faculty. Design teams will be organized. Each project will include the use of open-ended problems, development and use of design methodology, formulation of design problem statements and specifications, consideration of alternative solutions, feasibility considerations, and detailed system descriptions. It should include realistic constraints (such as economic factors, safety, reliability, maintenance, aesthetics, ethics, and social impact). *Prereq.* ME 1335 and ME 1337.

ME 1337 Thermal Design 5 QH

Focuses on developing the ability of the students to synthesize their knowledge and understanding of the concepts of thermodynamics, fluid mechanics, and heat transfer to meet the specifications of various thermal design objectives through the assignment of open-ended problems. Reviews fundamentals of heat transfer and fluid mechanics, numerical methods in heat transfer, heat transfer analysis of heat exchangers, heat exchanger pressure drop analysis, modeling, system simulation, and topics in optimization. One or more design projects are assigned. Utilizes various software on mainframe and microcomputers throughout the course and in the projects. *Prereq.* ME 1365.

ME 1338 Design Project 2 5 QH

Continues the project started in ME 1336. Students remain in the same group and under the direction of the same faculty advisers as in ME 1336. These guidelines may be waived in exceptional cases with the department chair's approval. *Prereq.* ME 1336.

ME 1340 Thermodynamics 4 QH

Thermodynamics is the study of systems in which energy and its flow across systems boundaries are important. In this course, energy, heat, and work are defined and used in the First Law of Thermodynamics. Introduces other thermodynamic properties

and equations of state, with emphasis on tabular and graphical forms for simple compressible systems and on the ideal gas. Introduces the Second Law of Thermodynamics and the property entropy, and discusses their macro- and microscopic implications. Concentrates on basic concepts and their proper application to representative engineering systems. *Prereq.* MTH 1223; *not open to mechanical engineering majors.*

ME 1360 Thermodynamics I 5 QH

Thermodynamics is the study of systems in which energy and its flow across systems boundaries are important. Defines energy, heat, and work in the First Law of Thermodynamics. Introduces other thermodynamic properties and equations of state, with emphasis on tabular and graphical forms for simple and compressible systems on the ideal gas. Discusses phases and phase transitions, and examines energy analysis of both open and closed systems. Introduces macro- and microscopic implications of the Second Law of Thermodynamics and the property entropy, and discusses their macro- and microscopic implications. Emphasizes the macroscopic consequences of irreversibility and the limitation this places, through the Second Law, on the behavior of engineering systems. This course meets four times weekly and integrates problem-solving strategies while concentrating on basic concepts. *Prereq.* MTH 1223 taken concurrently.

ME 1361 Thermodynamics 2 5 QH

Studies of vapor power systems including the Rankine cycle and its modifications for use with both fossil and nuclear fuels, vapor refrigeration systems, and all-gas cycles including the Brayton cycle and its modifications; the Otto cycle; the Diesel cycle; and supercharging and turbo-charging. Introduces the concepts of availability and irreversibility and thermodynamics of nonreacting mixtures with applications to air/water/vapor mixtures for air-conditioning systems and cooling towers. Discusses the elements of optimum power plant design. *Prereq.* ME 1360.

ME 1362 Thermodynamics 3 5 QH

Continues the thermofluids sequence. Topics include thermodynamic relations using generalized charts; reacting gas mixtures and combustion; and chemical equilibrium. Introduces one-dimensional compressible flow, including isentropic flow with area change; and normal shock waves. Includes a lab. *Prereq.* ME 1361.

ME 1365 Heat Transfer 5 QH

Studies the theories that describe conduction, convection, and thermal radiation heat transfer mechanisms. Discusses steady-state and transient conduction problems in rectangular, cylindrical, and spherical coordinate systems. Studies convective heat transfer mechanisms, and introduces various correlations. Presents a description of thermal radiation heat transfer between surfaces. Includes various lab experiments. *Prereq.* ME 1360, ME 1375, and MTH 1226.

ME 1375 Fluid Mechanics 5 QH

Studies fundamental principles in fluid mechanics. Topics include hydrostatics (pressure distribution, forces on submerged surfaces, and buoyancy); Newton's law of viscosity; dimensional analysis; integral forms of the basic laws (conservation of mass, momentum, and energy); pipe flow analysis; and differential formulation of basic laws with laminar flow analyses. Includes labs and a computer project. *Prereq.* ME 1360 and MTH 1225.

ME 1380 Materials Science 5 QH

Introduces materials science for engineers, emphasizing the structure/property/function relation. Topics include crystallography, structure of solids, imperfections in crystals, phase equilibrium, phase transformations, diffusion, and physical/electrical properties. Includes a lab. *Prereq.* CHM 1132 and ME 1360.

ME 1386 Materials Science 4 QH

Introduces materials science for engineers, emphasizing the structure/property/function relation. Topics include crystallography, structure of solids, imperfections in crystals, phase equilibrium, electrical and magnetic properties of metals, semiconductors and junctions. *Prereq.* CHM 1132.

ME 1392 Measurements and Analysis 5 QH

Examines design of experiments, instrumentation, measurements, data analysis, and report writing. Applies the principles developed in class to a variety of lab experiments. Requires written reports. Topics include force, strain, rotational frequency, temperature, pressure, power, and A/D conversion techniques. Lab fee.

ME 1401 Applied Elasticity 4 QH

Topics include analysis of curved beams, rings, and thick-walled pressure vessels; introduction to plane elasticity problems using rectangular and polar coordinate systems; and concepts of stress and strength. *Prereq.* ME 1314.

ME 1408 System Analysis and Control 4 QH

Explores the theoretical background necessary to analyze and design simple linear control systems. Focuses on system modeling, linear approximations and their limitations, transfer functions, and block diagrams; transient and frequency response; and stability. Discusses frequency domain and root locus techniques. *Prereq.* ME 1315.

ME 1410 Design for Space Applications 4 QH

Studies Keplerian motion and transfer dynamics using Battin's solution. Considers optimization of transfer dynamics with respect to our solar system; and mass optimization, boost, and reentry dynamics. Utilizes integrated design throughout the course. *Prereq.* ME 1315.

ME 1415 Mechanical Vibrations 5 QH

Studies one-, two-, and multi-degrees of freedom systems using classical, energy, Laplace, matrix, and computer techniques. Includes lab demonstrating vibration measurement. *Prereq.* ME 1202.

ME 1430 Aspects of Forensic Design 4 QH

Utilizes case studies in which students assume various investigative and court room roles, including (for both plaintiff and defendant) expert witnesses, lawyers, field and office engineers, and jury discussion. Examines consumer protection accidents, the effect of changing standards and codes, classes of mechanical systems normally involved in consumer cases, the methodology of technical questioning, and writing and presenting expert reports. *Prereq.* ME 1335 and ME 1337.

ME 1435 Computer-Aided Design 4 QH

Introduces the concepts of computational and numerical geometry for design. Includes the implementation of computer graphics in design and use of computer-aided design packages. Covers

principles of numerical control techniques to design and manufacture. Requires a design project. *Prereq.* GE 1100 and ME 1314.

ME 1436 Advanced Computer-Aided Design 4 QH

Covers advanced applications of interactive graphics concepts to different engineering tasks including animation; solid modeling; numerical control; mass properties; finite element modeling and analysis; and other traditional engineering analysis. Presents advanced concepts and features of interactive graphics and analysis programming languages. Includes FORTRAN interface and CAD/CAM packages to give students hands-on experience in lab settings. Requires a design project. *Prereq.* ME 1435.

ME 1470 Fluid Mechanics 2 4 QH

Covers velocity potential and stream functions; circulation and Kelvin's theorem; two-dimensional, steady irrotational incompressible flow; and Karman-Pohlhausen method applied to two-dimensional boundary layers. *Prereq.* ME 1375.

ME 1473 Gas Dynamics 4 QH

Focuses on application of the principles of fluid mechanics to compressible flows. Discusses wave propagation and the concepts of sound speed and Mach number. Emphasizes one-dimensional steady flows including the effects of area change, friction, and heat transfer. Considers normal shock waves and the possibility of choking. *Prereq.* ME 1375.

ME 1480 Mechanical Behavior of Materials 4 QH

Studies the physical basis for the mechanical behavior of solid materials, including elasticity, plasticity, viscoelasticity, and fracture. Discusses structural alloys and polymers. *Prereq.* ME 1203 and ME 1380.

ME 1483 Materials Processing 4 QH

Surveys the essential features and materials limitation of various methods for processing materials. Topics include heat treatment (ferrous and nonferrous alloys), casting, forming, joining, and machining. *Prereq.* ME 1380.

ME 1490 Special Topics 4 QH

When offered, topics will vary depending on the interests of a group of students and/or of the department. *Prereq.* Permission of the department.

ME 1496 Mechanical Engineering Project 1 4 QH

Involves a project of an analytical or experimental nature. Each student must, before the end of the first week of the quarter, obtain written approval for a proposed project from the department chair and a department faculty member under whom the student will work. A formal report must be submitted to the faculty supervisor at the end of the quarter. *Prereq.* Senior standing.

ME 1541 Nuclear Engineering 1 4 QH

Studies nuclear physics emphasizing atomic and nuclear structure, and radioactive decay and nuclear reactions, with particular attention to fusion and fission. Examines health physics, nuclear instrumentation, and the production and uses of radioactive isotopes. Compares thermal, fast, and breeder reactor types prior to a discussion of neutron interactions and their slowing down. Develops the four-factor formula and diffusion equation as applied to one-group theory for bare and reflected thermal reactors. Discusses flux shaping as well as energy production and distribution within the core. *Prereq.* ME 1361.

ME 1542 Nuclear Engineering 2 4 QH

Focuses on development of two-group theory for thermal reactors and considers the physics and safety of fast reactors. Discusses the effect of reactivity change, either intentional or accidental, as well as changes due to temperature, fission product build-up, xenon build-up after shutdown, and fuel depletion. Explores reactor design considerations involving the interrelation of reactor physics, reactor engineering control, distribution of power, and fuel cycle management. *Prereq.* ME 1541.

ME 1545 Internal Combustion Engines 4 QH

Presents the concepts and theories of operation of internal combustion engines based upon the fundamental engineering sciences of thermodynamics, gas dynamics, heat transfer, and mechanics. Discusses the design and operating characteristics of conventional spark-ignition, compression-ignition, Wankel, and stratified charge spark-ignition engines. Includes performance analysis using computer programs and Newhall-Starkman charts. *Prereq.* ME 1361.

ME 1580 Engineering Materials 4 QH

Discusses the utilization of materials science in the application and selection of materials. Topics include reactions with environment, such as oxidation and corrosion; materials selection criteria; and materials engineering case studies dealing with materials selection and failure analysis. *Prereq.* ME 1380.

ME 1702 Dynamics 1 (Honors) 5 QH

Honors equivalent of ME 1202. The honors section will meet as a separate recitation section for additional lectures and other activities related to the theory and applications of dynamics. *Prereq.* ME 1201.

ME 1703 Strength of Materials 1 (Honors) 5 QH

Honors equivalent of ME 1203. The honors section meets separately for lab and other activities related to the theory and applications of strength of materials. *Prereq.* ME 1201.

ME 1760 Thermodynamics 1 (Honors) 5 QH

Honors equivalent of ME 1360. The honors section will meet as a separate recitation section for additional lectures and other activities related to the theory and applications of thermodynamics. *Prereq.* MTH 1223 taken concurrently.

ME 1765 Heat Transfer (Honors) 5 QH

Honors equivalent of ME 1365. The honors section meets separately for lab and other activities related to the theory and applications of heat transfer. *Prereq.* ME 1360, ME 1375, and MTH 1226.

ME 1777 Honors Adjunct 1 QH

To be added to any 4 QH course in the department when approved by the Honors Committee of the College of Engineering. Once approved, the adjunct information is forwarded to the honors office for dissemination to the honors membership. Students may enroll in ME 1777 an unlimited number of times as it can be an adjunct to any mechanical engineering course.

ME 1796 Independent Study/Research 1 (Honors) 4 QH

Involves an analytical or experimental project. Before the end of the first week of the quarter, each student must obtain written approval for a proposed project from a department faculty member under whom the student will work and from the College of Engineering's Honors Committee. A formal report must be sub-

mitted to the faculty supervisor at the end of the quarter. *Prereq.*
Junior or senior standing in the honors program.

ME 1797 Independent Study/Research 2 (Honors)

4 QH

Continues ME 1796. *Prereq.* ME 1796.

Engineering Technology

Computer Technology

CT 1150 Computer Organization

4 QH

Presents basic computer architecture. Topics include number systems' operation and conversion, logic circuits, registers, data busses, ROM/RAM, microcomputer structure and operation, microprocessor internal components, microprocessor programming, and input/output processing. *Prereq.* CT 1105.

CT 1311 Programming with C Language

4 QH

Teaches C, a general purpose language suitable for programming operating systems, text-processing, and databases. Covers functions, arrays, character strings, global and local variables, scope rules, pointers, address arithmetic, structures, unions, and singular linked lists. A project is required. *Prereq.* GET 1100.

CT 1330 Data Structures

4 QH

Introduces methods of representing and manipulating data in computer memory. Topics include stacks, queues, lists, trees, heaps, sets, graphs, searching, and sorting. *Prereq.* CT 1311.

CT 1335 Numerical Methods

4 QH

Presents computer methods for solving mathematical problems. Involves writing and running application programs using the University's computer facilities. Covers deterministic versus stochastic methods, random number generators, iterative versus noniterative solutions, maxima and minima in two and three variables, curve fitting in two and three variables, integrals, trapezoidal and Simpson's rules, slopes, difference equations in two and three variables, vector and matrix algebra, simultaneous linear equations, nonlinear equations, permutations, and combinations. *Prereq.* CT 1311 and MTH 1195.

CT 1340 Software Engineering Design

4 QH

Offers structured methods for developing complex computer software. Provides students the opportunity to develop structured specifications, structured designs, and computer programs for complex problems and to test those programs using the University's computers. Topics include partitioning, hierarchical organization, data flow diagrams, data dictionaries, structured English, decision trees, decision tables, structured charts, team design, structured programs, and maintainability. *Prereq.* CT 1311 or CT 4311.

CT 1345 Assembly Language

4 QH

Teaches typical microprocessor assembly language. Involves writing and running programs on a 68000 microprocessor-based system. Covers CPU architecture, instruction sets, addressing modes, binary operation, code conversion, subroutines, macros, and input/output. *Prereq.* CT 1311 and CT 1150.

CT 1348 LISP

4 QH

Introduces an interactive language in which the LISP interpreter is commonly referred to as the read-evaluate-print loop. Discusses LISP's various levels of implementation in detail. Explores LISP as an excellent medium for implementing standard techniques in data-structure manipulation, techniques for recursion, complex data structures, storage management, and symbol-table manipulation. *Prereq.* CT 1330 or CT 4330.

CT 1351 Advanced Computer Organization

4 QH

Examines the functional characteristics of complex and special-purpose computer systems, the functions of a general-purpose multiuser, and a multiprocessing operating system. Advanced topics include virtual memory and virtual machine architectures, distributed and multiprocessor systems, array processors, and system performance analysis. *Prereq.* CT 1356 and CT 1375, or CT 4356 and CT 4375.

CT 1355 Microprocessor Peripheral Hardware

4 QH

Covers the elements of microprocessor peripheral hardware and its interfacing. Involves designing and analyzing microprocessor systems, including detailed schematics, timing diagrams, and technical documentation. Topics include serial input/output devices, DMA and interrupt control devices, standard busses, bus arbitration techniques, and bus support VLSI. *Prereq.* CT 1374.

CT 1356 Complex Peripheral Hardware

4 QH

Studies the interfacing and implementation of complex peripheral systems. Topics include disk and tape interfaces, graphic display devices, communication interfaces and subsystems, and input/output processors. *Prereq.* CT 1355.

CT 1360 Industry Software

4 QH

Surveys current commercial software packages and methods. Involves the exercise of commercial packages implemented on the University's computer facilities where applicable. Topics include specific current packages and methods drawn from the categories of database management, scientific and statistical analysis, security and privacy, software assurance, and documentation. *Prereq.* CT 1381.

CT 1363 Concurrent Programming

4 QH

Examines the principles of concurrent programming. Involves writing and running programs to demonstrate aspects of concurrent programming techniques and issues. Explores correctness of concurrent programs, material exclusion, the timing of Dekker's algorithms, the producer-consumer problem, monitors, semaphores, "Ada Rendezvous," critical regions, and conditional variables. *Prereq.* CT 1330 and CT 1340, or CT 4330 and CT 4340.

CT 1365 Industry Hardware

4 QH

Discusses the latest industrial developments and trends in computer hardware. Conducted as a seminar. *Prereq.* CT 1356.

CT 1368 Semiconductor Logic

4 QH

Analyzes the bipolar and MOS transistors in saturated and cutoff conditions. Examines implementing these concepts to form basic logic circuits and standard logic families, and to convert logical expressions into hardware configuration representations. Topics include Ebers-Moll modeling, PMOS, NMOS, CMOS, bipolar characteristics, and standard logic families. *Prereq.* EET 1311.

CT 1369 Computer Logic

4 QH

Introduces the hardware building blocks of digital computers. Teaches students to specify configurations of gates and memory components to achieve combinational and sequential composite logical functions, and perform finite state machine design and analysis. Topics include gates, flip-flops, registers, decoders,

ALUs, memory arrays, and synchronous and asynchronous state machines. *Prereq.* CT 1368.

CT 1374 Introduction to CPU Hardware 4 QH

Introduces the circuits and operation of a microcomputer. Studies the microprocessor and its basic support components and circuits, including detailed timing and functional analysis of their interactions. Topics include central processing unit, memory, addressing, clocking, bus concepts, interrupts, coprocessors, input/output, and instruction timing. *Prereq.* CT 1345 or CT 4345, and CT 1368 or CT 4368.

CT 1375 CPU Architecture 4 QH

Presents high performance microprocessor architecture and hardware interfacing techniques. Analyzes current commercial processors and their support components. Topics include internal CPU architecture, memory management, instruction prefetch, privilege states, bus cycles, control lines, input/output, interrupts, exceptions, and pipelining. *Prereq.* CT 1374.

CT 1377 VLSI Design 4 QH

Introduces Very Large Scale Integration (VLSI) integrated circuits (ICs), the key components of all modern computers. Examines MOS devices, circuits, design methods, and fabrication techniques used in producing custom VLSI ICs. Topics include MOS transistor characteristics; basic gate circuits; scaling; layout tools, both manual and automated; wafer-fabrication techniques; standards; testing; and costs. *Prereq.* CT 1369.

CT 1379 Computer Networks 4 QH

Replaced by CT 1480.

CT 1380 Data Communication Methods 4 QH

Discusses the ISO Open Systems Interconnect model for communication systems, including the functional and operational aspects of data communication devices and software. Uses a black box approach. Topics include modems, control units, multiplexers, concentrators, front-end processors, and error checking. *Prereq.* CT 1375.

CT 1381 Operating Systems 4 QH

Introduces the basic principles and organization of operating system implementation. Topics include processor management, process multiplexing and synchronization, schedules, atomic operations and mutual exclusion, sequential and concurrent programming, memory, and device and data management. *Prereq.* CT 1330 and CT 1345.

CT 1382 Computer Graphics Programming 4 QH

Explores the computer plotting of two- and three-dimensional shapes. Involves writing and running programs using the University's computer and digital plotter. Considers 2D transforms; 3D to 2D transforms; surface representation; shaping; hidden line; raster technology-color; introduction to interactive graphics and characters; curve fitting; and graphic data structures. *Prereq.* GET 1100.

CT 1383 Databases 4 QH

Examines database organization structure and management. Involves writing and running programs exemplifying techniques developed in class, using the University's computer facilities. Topics include access methods, attributes, indices, keys, querying, searching and matching, file sets, inverted file sets, normal forms, and random access. *Prereq.* CT 1330.

CT 1384 Large System Assembly Languages 4 QH

Utilizes VAX-11 assembly language macro to show how basic components in the CPU are used during program execution. Emphasizes integer, real, and character instruction sets; various address techniques; procedure linkage; and main and system input/output. Utilizes the University's computer facilities to run program assignments. *Prereq.* CT 1345 or CT 4345.

CT 1387 Bit-Slice Microcomputers 4 QH

The epitome of hardware flexibility is represented by the bit-slice CPU. Demonstrates the basic design ground rules common to this style of hardware design. *Prereq.* CT 1355 or CT 4355.

CT 1389 Single-Chip Microprocessors 4 QH

When small 8-bit intelligent devices are rewired in high volume, the single-chip microprocessor in the form of the 3870, 8084 Z8, and others comes into play. An understanding of the hardware limitations of a single-chip system presents the basis for this subject material. *Prereq.* CT 1374 or CT 4374.

CT 1390 Special Problems in Computer Technology 4 QH

Students perform theoretical or experimental work under individual faculty supervision. *Prereq.* Permission of department chair.

CT 1395 Computer Security 4 QH

Focuses on issues related to security in computing, including the history of security, encryption techniques and applications, secure communications, and software protection. Covers software verification and validation, security design in hardware, and products currently available for recurring systems and data. Discusses privacy as well as reliability. *Prereq.* CT 1380 or CT 4380.

CT 1396 PROLOG: An Introduction to Artificial Intelligence 4 QH

Introduces fundamental artificial intelligence (AI) terms and techniques using PROLOG as a programming language. Topics include knowledge representation, search, parsing, logic, and inference techniques. Uses student projects as an integral part of the course. *Prereq.* CT 1330 or CT 4330.

CT 1480 Local Area Networks I 4 QH

Introduces local area network (LAN) concepts, architectures, application, protocols, and components. Focuses on first three layers of the ISO reference model: physical, data line, and network layers. Examines Ethernet, SNA, Token Bus, Token Ring, and other IEEE standards. *Prereq.* CT 1380 or CT 4380. *Not open to students who have taken CT 1379 or CT 4379.*

Electrical Engineering Technology

EET 1151 Circuit Analysis I 4 QH

Examines Ohm's law, Kirchhoff's current and voltage laws, equivalent resistances, independent and dependent sources, mesh and nodal analysis, and power relations, all concentrating on direct current circuits. Other topics include Thevenin and Norton theorems, the operational amplifier, and energy storage elements such as capacitors and inductors. *Prereq.* MTH 1193 or PHY 1193.

EET 1152 Circuit Analysis 2 4 QH

Studies time domain (transient) analysis of R, L, and C elements; energy storage in L and C circuits; and responses in source-free RL and RC circuits. Includes application of the unit step function

and response of RLC circuits. Introduces frequency domain methods to solve sinusoidal steady-state circuits using complex frequency concepts and phasor algebra; three-phase circuits; and three-wire, single-phase systems. *Prereq.* EET 1151.

EET 1310 Electrical Measurements 4 QH

Covers standards of measurements, dimensional analysis, errors and measurement of dispersed data, discrete and continuous variables, binomial distribution, and normal distribution. Topics include guaranteed error, methods of resistance measurements, digital voltmeters and analog-to-digital conversion, voltage references, and potentiometers and AC bridges. *Prereq.* EET 1353.

EET 1311 Electronics I 4 QH

Introduces students to solid-state electronic devices such as diodes and transistors, emphasizing specifications, circuit characteristics, and techniques for analyzing circuit behavior. Investigates diodes application in rectification, power supply regulation, clipping, clamping, and voltage doubling situations. Includes analysis and design of transistor circuit topologies and bias networks. *Prereq.* EET 1152.

EET 1312 Electronics 2 4 QH

Investigates transistor bias stabilization of discrete and integrated circuits. Examines signal models of diodes and BJT, JFET, and MOSFET transistors. Analyzes single transistor amplifier configurations and multistage amplifiers. Investigates frequency response, amplitude, and phase characteristics of transistor circuits by using techniques such as the Bode plots. Presents design methods of coupling signals among amplifier states. *Prereq.* EET 1311.

EET 1313 Electronics 3 4 QH

Focuses on feedback and its application to operational amplifier circuits for signal processing and generation. Topics include stabilizing gain and bias, improving bandwidth, reducing distortion, and impedance variation. Involves analysis and design of inverting and noninverting configurations of operational amplifier circuits, including rectifiers, oscillators, and filters. *Prereq.* EET 1312.

EET 1314 Pulse and Digital 1 4 QH

Studies switching characteristics of semiconductor devices; logic gates and the logic families ECL, MOS, and Schottky TTL; speed limitations; and concepts of wave-shaping and wave-generating circuits including comparators, Schmitt trigger, and relaxation oscillators. *Prereq.* EET 1311.

EET 1315 Pulse and Digital 2 4 QH

Examines digital operations, logic statements and theorems, minimization of logic functions, logic gates and the characteristics of the integrated logic families, flip-flops, counters, and registers. Introduces sequential circuit design, sample and hold circuits, and analog-to-digital conversion. *Prereq.* EET 1314.

EET 1317 Principles of Communication Systems 1 4 QH

Focuses on signal analysis using Fourier methods, noise in communication systems, frequency selective amplifiers, including wideband, transistor power amplifiers AF and RF, oscillators, and signal sources and applications. *Prereq.* EET 1313.

EET 1318 Principles of Communication Systems 2 4 QH

Explores basic theory of amplitude, frequency, phase and pulse code modulated systems, analysis of modulating and demodulating circuits. Topics include carrier systems using SSB, system

block and level diagrams, logic control circuits in communication systems, and modems. *Prereq.* EET 1317.

EET 1319 Principles of Communication Systems 3 4 QH

Emphasizes the fundamentals of digital communications, sampling requirements, analog-to-digital conversion methods, and system capacity and bandwidth. Topics include comparison of practical digital systems PAM, PCM, PFM, PWM, time and frequency division multiplexing, data decoding, and selected examples from telemetry and computer links. *Prereq.* EET 1318.

EET 1320 Electricity and Electronics I 4 QH

Introduces circuit analysis, resistive networks, periodic excitation function, steady-state AC circuits, the physical foundations of electronics, and the physical operation of electronic devices. *Prereq.* MTH 1193 and PHY 1193. Not open to electrical engineering technology majors.

EET 1321 Electricity and Electronics 2 4 QH

Examines single-stage electronic circuits, magnetic circuits and transformers, electro-mechanical energy conversion, DC machines, and AC machines. *Prereq.* EET 1320.

EET 1323 Electronic Laboratory 2 QH

Offers experiments with nonlinear semiconductors. Explores junction and zener diodes. Studies typical applications in clippers, clampers, rectification, filtering, electronic power supplies, voltage regulation, and integrated circuit regulators. Discusses bipolar and field effect transistors, amplifiers and voltage follower configurations, special semiconductors, and operational amplifiers. *Prereq.* EET 1311.

EET 1324 Circuits Laboratory 1 2 QH

Offers experiments in DC electrical circuits and measurement techniques. Includes use of ammeters, ohmmeters, voltmeters, VOMs, and power supplies. Studies equivalent resistance, series and parallel circuits, Ohm's law, Thevenin and Norton theorems, and superposition and maximum power transfer theorems. *Prereq.* EET 1151.

EET 1325 Circuits Laboratory 2 2 QH

Offers further experiments in electrical circuits and measurement techniques. Includes operation of oscilloscopes, audio frequency, and function generators. Explores inductance and capacitance, and the effect of frequency upon them. Studies amplitude, frequency, and phase shift measurements using a variety of series/parallel RL, RC, and RLC circuitry. Examines circuit time constants and their relation to repetition rate, along with resonance, circuit quality, and filter circuits. *Prereq.* EET 1124.

EET 1327 Advanced Electronics Laboratory 1 2 QH

Offers experiments using oscilloscopes, the examination of transistor audio amplifiers, push-pull amplifiers, drivers, pulse and video amplifiers. Topics include transients and wave-shaping circuits, audio frequency oscillators, and the study of operational amplifiers. *Prereq.* EET 1323.

EET 1328 Advanced Electronics Laboratory 2 2 QH

Experiments with the modulation of a class C amplifier, the diode detector, basic timing circuits, RF and crystal oscillators, astable multivibrators, logic gates, flip-flops, binary adders, registers and counters. Topics include active filters, frequency modulation detectors, and analog-to-digital and digital-to-analog conversion. *Prereq.* EET 1327.

EET 1329 Advanced Electronics Laboratory 3**2 QH**

Studies FM and PM waves, amplitude limiters, the balanced modulators and single sideband generators. Discusses integrated circuit timers and monolithic random access memory, and monolithic phase-locked loop, as well as a series of microwave experiments and digital experiments. *Prereq.* EET 1328.

EET 1330 Energy Conversion**4 QH**

Investigates generalized theory of rotating energy conversion devices, steady-state operation of the multiply-excited direct-current machine, control of speed, special machines, transformers, steady-state considerations of induction and synchronous machines. Explores the generalized machine and circuit model, and Laplace transform techniques applied to the analysis of dynamic operating modes of rotating machines. *Prereq.* EET 1152 and MTH 1195.

EET 1337 Distributed Systems**4 QH**

Examines radiation, transmission, and reception of electromagnetic waves, distributed-line constants and traveling waves of transmission lines, and differential equations of the uniform line. *Prereq.* MTH 1195 and PHY 1193.

EET 1353 Circuits Analysis 3**4 QH**

Applications of differential equations to the solutions of linear, and time-invariant electrical networks. Introduces to singularity functions, convolution, and time-domain transient analysis, network topology and duality, and the methods of transformation calculus and complex frequency concepts. *Prereq.* EET 1152.

EET 1354 Circuits Analysis 4**4 QH**

Focuses on signal analysis in the frequency domain, Fourier series, Fourier and Laplace transform methods, and a varied selection of circuit problems using Laplace transforms and related theorems. *Prereq.* EET 1353.

EET 1360 Engineering Analysis 1**4 QH**

Studies linear algebra and circuit equation applications, as well as solution of linear differential equations, including an introduction to Laplace transforms. *Prereq.* EET 1152 and MTH 1195.

EET 1362 Basic Power Systems 1**4 QH**

Focuses on power transmission lines, line constants, current voltage and power relations, electric-power distribution loads, feeders, and substations, and application of matrices. *Prereq.* EET 1354.

EET 1363 Basic Power Systems 2**4 QH**

Investigates symmetrical and asymmetrical faults, protective devices—application and coordination, power flow in electric circuits, steady-state power limitations of systems, and voltage regulation theory and application. *Prereq.* EET 1362.

EET 1364 Basic Power Systems 3**4 QH**

Offers computer applications to power systems with emphasis on load-flow studies, basic ideas of systems planning, short-circuit studies, and system stability. *Prereq.* EET 1363.

EET 1370 Digital Computers 1**4 QH**

Introduces digital computer design. Topics include general computer organization, number systems and number representations, design characteristics of major computer units, and Boolean algebra applications to computer design. *Prereq.* EET 1311.

EET 1371 Digital Computers 2**4 QH**

Examines microprocessor architecture and organization. Studies the machine language and assembly coding of an industry-accepted microprocessor, and a suitable topic from the current literature. Assembly language coding problems assigned. *Prereq.* EET 1370.

EET 1377 Control Engineering 1**4 QH**

Analyzes linear servomechanisms under both transient and steady-state conditions, signal flow graphs, and Laplace transforms in the formulation of block diagrams and transfer function. *Prereq.* EET 1354 and MTH 1195.

EET 1378 Control Engineering 2**4 QH**

Focuses on system stability, root locus techniques, and treatment of Nyquist criteria and Bode diagram methods for systems evaluation. *Prereq.* EET 1377.

EET 1390 Optical Instrumentation**4 QH**

Focuses on telescopes, microscopes, and similar equipment, as optical system components. Includes magnification, aberrations, resolution criteria, photometry, compatibility of system components and optimization of systems, and the basic nonimage-forming systems used for analysis control and metrology. *Prereq.* MTH 1192 and PHY 1193.

EET 1399 Special Problems in Electrical Engineering Technology**4 QH**

Offers theoretical or experimental work under individual faculty supervision. *Prereq.* Permission of department chair.

General Engineering Technology

GET 1100 Computer Programming for Engineering Technology**4 QH**

Introduces computers for problem solving using C language. Topics include arrays, functions, and character manipulations. Students use the University's computer facilities to run programs. *Prereq.* MTH 1191, MTH 4107, or either taken concurrently.

GET 1170 Engineering Graphics 1**4 QH**

Introduces manual and computer engineering drawing using geometric constructions, charts, and graphs. Geometric construction includes descriptive geometry, orthographic projection, sections, and isometric drawing.

GET 1171 Engineering Graphics 2**4 QH**

Studies computer and manual drawing in layout and assembly graphics. Topics include manufacturing processes, fasteners, gears, welding, electric/electronic drawing, architectural/structural drawing, piping, and topography. Design project required. *Prereq.* GET 1170 or equiv.

GET 1356 Engineering Economy**4 QH**

Presents fundamental accounting concepts and terminology, including assets, liability, net worth, and analyzing income statements and balance sheets. Discusses introductory steps in analyzing investment proposals, time value of money, and cash flows. Analyzes cash flows in terms of present worth, annual worth, rate of return, and benefit/cost ratio. Considers depreciation and tax effects on cash flows. *Prereq.* MTH 1191.

GET 1364 Kinematics

Studies four-bar linkages, sliders, and others, using orthogonal components of vectors, instantaneous centers, equivalent linkages, and effective cranks. Emphasizes graphic solutions and introduces the computer as a tool to enhance these concepts. Analyzes reverted and epicyclic gear trains and cam displacement. *Prereq.* GET 1171 and PHY 1191.

4 QH

Topics include stresses and power transmission of spur, bevel, and worm gear, shaft design, and clutches and brakes. *Prereq.* MET 1330 or MET 4330.

Mechanical Engineering Technology

MET 1301 Mechanics A

Explores forces, moments, couples, statics of particles, and rigid bodies in two- and three-dimensions. Examines external and internal distributed forces, first moments and centroids, and structures such as trusses, frames, and machines. *Prereq.* MTH 1193 or MTH 4120; PHY 1191 or PHY 4117.

4 QH**MET 1341 Thermodynamics B**

Discusses theory of vapor engines and analysis of actual engine types using gas and vapor compression, internal combustion engines, theory of gas and vapor flow through orifices and nozzles, and principles of gas compression. Includes analysis of vapor compression, refrigeration systems, low-temperature refrigeration cycles, and absorption refrigeration systems. *Prereq.* MET 1340 or MET 4340.

4 QH**MET 1302 Mechanics B**

Emphasizes friction, second moments, virtual work, kinematics of particles, rectilinear and curvilinear motion of dynamic particles. Topics include force, mass and acceleration, and work and energy. *Prereq.* MET 1301 or MET 4301.

4 QH**MET 1342 Refrigeration and Air-Conditioning**

Focuses on air-conditioning principles, including psychometrics and heat pumps. Examines calculation of heating and cooling loads in accordance with ASHRAE practices, principles of gas compression, analysis of vapor compression, refrigeration systems, low-temperature refrigeration cycles, and absorption refrigeration systems. *Prereq.* MET 1341 or MET 4341.

4 QH**MET 1303 Mechanics C**

Studies impulse and momentum of particles. Topics include kinematics and dynamics of rigid bodies: force, mass, and acceleration; dynamics of rigid bodies: work and energy, and impulse and momentum; and introduction to mechanical vibration. *Prereq.* MET 1302 or MET 4302.

4 QH**MET 1343 Heat Transfer**

Presents the principles of heat transfer: thermal conductivity and thermal conductance/resistance. Examines heat transfer mechanisms, equations of conduction, and natural and forced convection. Studies hydrodynamic and thermal boundary layers, black body radiation, and Kirchhoff's law. Covers emissivity and absorptivity, radiation between simple bodies, heat transfer coefficients, heat changer effectiveness, and regenerative and evaporative heat exchangers. *Prereq.* MET 1341.

4 QH**MET 1314 Stress Analysis A**

Investigates axially loaded members, stress and strain, allowable stresses, factor of safety, temperature effects, indeterminate members and thin-walled pressure vessels. Topics include centric loading of bolted and welded connection, shear and moment in beams, eccentrically loaded connections, and flexural and transverse shearing stresses in beams. *Prereq.* MET 1301 or MET 4301.

4 QH**MET 1370 Fluid Mechanics A**

Investigates hydrostatics, principles governing fluids at rest, pressure measurement, hydrostatic forces on submerged areas and objects, and simple dams. Topics include fluids in moving vessels, hoop tension fluid flow in pipes under pressure, fluid energy, power, and friction loss, Bernoulli's theorem, and flow measurement. *Prereq.* MET 1302 or MET 4302.

4 QH**MET 1315 Stress Analysis B**

Discusses determinate and indeterminate beam deflections and reactions by numerical and graphical integration and area moment methods, theorem of three moments and torsional stresses and strains. Topics include power transmission, eccentric loads on struts, beams, riveted and welded joints, combined and principle stresses, Mohr's circle, and theories of failure. *Prereq.* MET 1314 or MET 4314.

4 QH**MET 1371 Fluid Mechanics B**

Explores pipe networks and reservoir systems, flow in open channels, uniform flow, energy, friction loss, minor losses, and velocity distribution. Topics include alternate stages of flow, critical flow, nonuniform flow, accelerated and retarded flow, and hydraulic jump and waves. *Prereq.* MET 1370 or MET 4370.

4 QH**MET 1319 Mechanics**

Introduces mechanics to nonmechanical majors. *Prereq.* MTH 1193 and PHY 1191.

4 QH**MET 1330 Mechanical Design A**

Introduces mechanical design, the design process, design factors, creativity, optimization, human factors, and value engineering. Discusses and develops principles through simple design projects. Topics include principles of design, properties and selection of materials; stress concentrations; strength under combined stresses; theories of failure; and impact, fluctuation, and repeated loads. *Prereq.* MET 1315 or MET 4315; MET 1380 or MET 4380.

4 QH**MET 1380 Materials A**

Introduces fundamental metallic structures, general metallurgical information covering theoretical aspects of properties, testing, and failure of metals. Supplemented by visual aids. Topics include alloying and hardening of metals, refinement of metals, equilibrium diagrams, characteristics of engineering metals, and principles of metal fabrication.

4 QH**MET 1331 Mechanical Design B**

Explores stresses, deformation and design of fasteners, screws, joints, springs, and bearings, lubrication, and journal bearings.

4 QH**MET 1390 Measurement and Analysis Laboratory**

Offers experiments for the collection and analysis of data by graphics and numerical methods including computer

2 QH

applications, report writing that draws conclusions relative to accuracy, precision, true values, and measured values as they relate to basic mechanical measuring instruments for length, area, volume, specific gravity, pressure, temperature, and time as these parameters are utilized in making mechanical measurements. *Prereq.* GET 1100 or GET 4100; MET 1314 or MET 4314; MTH 1195 or MTH 4122; and PHY 1193 or PHY 4119.

MET 1391 Technology Laboratory A

2 QH

Presents experiments to determine mechanical properties of materials under tensile, compressive, torsional, direct shear, flexural, impact, fatigue, and creep loading conditions as they are affected by normal and abnormal environmental conditions; also as they are affected by homogeneity, nonhomogeneity, isotropy, and nonisotropy. *Prereq.* MET 1315 or MET 4315; MET 1380 or MET 4380; MET 1390 or MET 4390; or taken concurrently.

MET 1392 Technology Laboratory B

2 QH

Offers experiments to determine the physical properties of incompressible fluids and to measure the flow rates and velocities utilizing pilot tubes, orifice plates, venturi and weirs flow meters, U-tube differential manometers, and piezometers as the fluid flows through open channels, partially filled conduits, conduits under pressure, pipe networks, turbines and pumps. *Prereq.* MET 1390 or MET 4390; MET 1370 or MET 4370; or taken concurrently.

MET 1393 Technology Laboratory C

2 QH

Explores basic thermodynamic relations. Experiments examine the flow of compressible fluids and steam and the energy conversion of a fuel into a working substance and the related heat-transfer mechanisms. Discusses operating characteristics of thermal generators, engines, and compressors. *Prereq.* MET 1390 or MET 4390; MET 1341 or MET 4341; or taken concurrently.

MET 1394 Technology Laboratory D

2 QH

Presents experiments to examine the operating characteristics and efficiencies of internal combustion engines, brake horsepower, indicated horsepower, friction horsepower, and mean effective pressure. Topics include fuel consumption, torque, ignition timing, manifold pressure, and compression ratios and internal engines as energy conversion systems, and energy conversion of fuels. *Prereq.* MET 1341 or MET 4341; MET 1343 or MET 4343; MET 1393 or MET 4393; or taken concurrently.

MET 1395 Technology Laboratory E

2 QH

Offers experiment, analytical, and design projects to examine refrigeration, air conditioning, and heating pump cycles. *Prereq.* MET 1342 or MET 4342; MET 1343 or MET 4343; and MET 1390 or MET 4390.

MET 1396 Machine Shop

4 QH

Introduces the study of machines for metal processing, cutting tools, and fluids, machinability, and automatic machinery.

MET 1414 Mechanical Vibrations

4 QH

Examines elements of vibrating systems, one degree of freedom (undamped free and forced vibration from Newton's law of motion and energy methods), natural frequencies, and damped free and forced vibration. Topics include impedance and mobility, systems with more than one degree of freedom; influence coefficients, Lagrange's equations, generalized coordinates, and vibration absorber. *Prereq.* MET 1303 or MET 4303.

MET 1415 Experimental Stress Analysis

4 QH

Explores theory and experimentation showing the application of extensometers and electrical strain gauges as transducers in the field of experimental stress and strain analysis. Presents theory and lab practice on photoelastic methods as applied to classical model analysis and modern coating analysis. *Prereq.* MET 1315 or MET 4315.

MET 1416 Stress Analysis C

4 QH

Discusses curved beam, asymmetrical bending of beams, shear-center and shear stresses on thin sections, composite beams; columns energy absorption and resilience, inertial stresses, impact loading, and deflection of beams by energy methods and bolted fastenings. *Prereq.* MET 1315 or MET 4315.

MET 1444 Power Generation

4 QH

Explores electrical power generation by thermomechanical, electromechanical, nuclear, and hydraulic systems. Analyzes thermodynamic cycles as well as practical deviations from the related ideal processes. Considers accessory and auxiliary equipment use. Studies design, performance, economic factors, and public issues affecting electrical power generation. *Prereq.* MET 1341.

MET 1481 Materials B

4 QH

Focuses on the study of inorganic materials (polymers, glasses, ceramics, cements, wood), and materials having important electrical and magnetic properties. A summary of the most recent applications for the fabrication and uses of both metals and non-metals. Structures of metals, imperfections, phase diagrams effect of temperature on structure and properties of metals (annealing, recrystallization, recovery, precipitation, diffusion) strengthening mechanisms, mechanical properties of nonferrous metals. Lab experiments in preparation of samples, selection, polishing, and etching; examination of nonferrous metals, use of the microscope, linear analysis construction of cooling curves, and simple binary-phase diagrams. *Prereq.* MET 1380 or MET 4380.

MET 1499 Special Problems in Mechanical Engineering Technology

4 QH

Theoretical or experimental work under individual faculty supervision. *Prereq.* Permission of department chair.

Nursing

NUR 1100 Introduction to Professional Nursing and the Health System 4 QH

Surveys the social, political, and economic forces that influence the nursing profession. Considers the historical development of nursing and its role and contribution to American society. Introduces the United States health sector and the social, political, and economic factors that affect health-care delivery. Views concepts of health and illness from their meanings to the general population. Encourages students to explore individual goals in the nursing profession.

NUR 1101 Introduction to the Theoretical Basis for Nursing Practice 4 QH

Introduces general concepts in professional nursing and in the nursing paradigm. Continues health, wellness, and illness issues introduced in NUR 1100. Explores the concepts of nursing process, teaching, learning, client, and adapting. Introduces observation, interview, and basic measurements as methods of collecting data in the assessment phase of the nursing process. Explores communication as an essential aspect of professional role behavior. Gives students the opportunity to practice interview and basic measurements. *Prereq.* NUR 1100 or permission of instructor.

NUR 1102 Introduction to Human Nutrition 4 QH

Explores the fundamental role of nutrition in promoting health. Studies the physiological functions of nutrients, their food sources, and recommended intakes for different age groups. Utilizes principles from the humanities and sciences in developing nutrition concepts. Introduces the use of different diet-assessment tools to assist individuals in meeting nutrient and energy needs. Encourages students to examine their own food choices and how those choices translate into meeting recommended nutrient and energy needs. Discusses the origins of food habits and the relevance of nutrition counseling and education in nursing practice. *Prereq.* NUR 1100 or permission of instructor.

NUR 1200 Nursing Basic Human Needs 1 6 QH

Gives the opportunity to explore the professional role in a clinical setting. Builds on knowledge of the Roy Adaptation Model; allows students to implement the nursing process in the four adaptive modes and also focus on psychomotor development skills. Offers students the chance to provide basic nursing care to selected clients. Through lectures and assignments, helps students utilize and explain scientific and conceptual bases for nursing activities. Explores professional responsibility in a legal and ethical framework with specific attention to the students' individual role development. *Prereq.* BIO 1115, BIO 1152, BIO 1153, CHM 1111, CHM 1112, NUR 1100, NUR 1101, NUR 1102, and sophomore standing.

NUR 1201 Nursing Basic Human Needs 2 6 QH

Allows students to continue developing in the professional role in a clinical setting. Emphasizes physical assessment and patient education. Offers students the chance to provide basic nursing care and to continue to strengthen their understanding of the nursing process by using the Roy Adaptation Model. Through lectures and assignments, helps students expand their scientific and conceptual basis for nursing activities. *Prereq.* BIO 1120, BIO 1154, NUR 1200, and sophomore standing.

NUR 1202 Introduction to Pathophysiological Concepts for Clinical Nursing 4 QH

Focuses on Roy's Physiological Mode. Covers oxygenation, nutrition, elimination, protective mechanisms, activity/neurological

functions, endocrine/regulator functions, and skin integrity.

Explores how the human body uses its adaptive powers to maintain a steady state and how alterations disrupt normal processes. Reviews disease processes and implications for nursing practice. *Prereq.* BIO 1115, BIO 1120, BIO 1152, BIO 1153, BIO 1154, and sophomore standing.

NUR 1300 Nursing Common Problems 7 QH

Focuses on specific physiologic alterations in adult health and on corresponding psychosocial adaptations in client and families. Employs Roy's Adaptation Model and addresses the adaptive behaviors in its four modes. Emphasizes the physiologic mode as the client moves along the illness/wellness continuum. Allows students to assess, plan, implement, and evaluate nursing care for selected adult clients under faculty guidance in the acute clinical setting. Gives students the opportunity to administer nursing care, collaborating with faculty, clients, primary nurses, and other appropriate health team members in the clinical practicum. *Prereq.* BIO 1254, NUR 1201, NUR 1202, PSY 1112, and middle standing.

NUR 1301 Psychiatric/Mental Health Nursing 7 QH

Examines the process used by the professional nurse in facilitating the adaptive responses and goal attainment of human systems. Specifically, focuses on the study of self-concept, role functioning, and interdependence among individuals, families, and groups. Studies the interpersonal process of professional nursing and how the nurse works with client systems in their striving toward survival, growth, reproduction, and mastery. Discusses how within this process, adaptive responses are enhanced and ineffective responses are altered. Uses the Roy Adaptation Model as the framework. *Prereq.* BIO 1254, NUR 1201, PSY 1112, and middle standing.

NUR 1302 Transition 9 QH

Introduces registered nurse students to the purposes, philosophy, and conceptual framework of the baccalaureate degree program. Provides students with the opportunity to complement and validate, through guided study, knowledge of professional roles and role conflicts, communication and group process, and principles of teaching, learning, and evaluation. Uses the Roy Adaptation Model in designing and providing nursing care, specifically with aging, chronically ill, and dying patients. Also discusses nutritional needs, with specific emphasis on aged, acute, and chronically ill clients. *Prereq.* BIO 1120, BIO 1140, BIO 1141, BIO 1253, BIO 1255, CHM 1111, CHM 1112, PSY 1111, PSY 1112, and registered nurse license.

NUR 1303 Life Crises: Analysis and Response 4 QH

Considers personal, family, and community crises identified from literature, health agency clientele, and student sources. Uses concepts from nursing, sociology, anthropology, and social psychology to assess critically the individual's experience of crisis and the approaches used by providers in human-service systems to help people in crisis. Gives students in consumer and/or health and human service roles the opportunity to critically examine the meaning of life crises in a social-cultural vs. psychopathological framework and to explore principles and creative strategies that might be used in responding constructively to crises in their own lives or in their experience as health or human-service workers. *Prereq.* Middle standing in nursing, criminal justice, applied social science, or the health professions.

NUR 1304 Independent Study Elective**2 QH**

Allows students to pursue a topic more intensely than in regular coursework. Students contract with a faculty member whose background, interests, and time allow direction of in-depth study. Student and faculty member jointly develop course objectives. *Prereq.* NUR 1201.

NUR 1400 Maternal and Child Nursing**9 QH**

Focuses on applying the Roy Adaptation Model in maintaining optimal health for child-bearing and child-rearing families. Using the four modes of the model, the student examines individuals and families at selected developmental stages. Presents theoretical content in four units, with the first two focusing on adaptive behaviors and the second two examining ineffective behaviors. Gives students the opportunity to assist clients in selected maternity and child-care settings in coping with the stress and stimuli that interfere with the adaptation process. *Prereq.* NUR 1300, NUR 1301, PCL 1305, PSY 1241, PSY 1242, and junior standing.

NUR 1401 Medical-Surgical Nursing**9 QH**

Focuses on the effects of episodes of acute illness on individuals, families, and community. Addresses the four modes of the Roy Adaptation Model. Emphasizes the alterations and adaptations in physiology characteristic of acute episodes of illness and the nurse's role in intervention. Also discusses the impact of illness on patterns of living, the needs for health teaching, and continuity of care. Provides guided clinical experiences, emphasizing the nursing process and the skills necessary to plan and implement care for adults in an acute-care setting. *Prereq.* NUR 1300, NUR 1301, PCL 1305, PSY 1241, PSY 1242, and junior standing.

NUR 1402 Health Assessment**4 QH**

Provides the student with additional theory and skills relevant to the clinical decision-making role of the nurse as a primary care-taker. Extends the student's knowledge and experience of history-taking and physical and psychosocial assessment. Emphasizes analysis and synthesis of data obtained from a holistic health assessment as an essential framework for the identification of common health abnormalities and the enhancement of the nurse's clinical decision-making skills. *Prereq.* NUR 1300, NUR 1301, or NUR 1302. *Open to upper-division students in nursing.*

NUR 1404 The Nurse Entrepreneur**4 QH**

Focuses on the role of the nurse as an entrepreneur. Within the generic functions of nursing, studies situations of patient family teaching that provide the framework for introducing students to the essentials of undertaking this function as a business venture. Includes the formation of a nurse entrepreneur's venture action plan to do patient and family teaching. *Open to middler students in nursing.*

NUR 1500 Community Health Nursing**9 QH**

Focuses on the use of the nursing process to promote the adaptation of individuals, families, groups, and communities. Examines utilization of the Roy Adaptation Model in addressing client needs. Analyzes the interrelationship of client and environmental factors as they relate to the attainment of health goals. Discusses the influence of the role of the community health nurse and cultural, political, socioeconomic, and epidemiological factors on client adaptation. *Prereq.* NUR 1400, NUR 1401, PSY 1242, SOA 1100, and senior standing.

NUR 1504 Contemporary Issues in Nursing**2 QH**

Analyzes sociological, political, legal, economic, ethical, historical, and ideological factors affecting contemporary nursing practice and the health-care system. Synthesizes professional role issues. *Prereq.* NUR 1400, NUR 1401, SOA 1100, and senior standing or permission of instructor.

NUR 1502 Introduction to Research in Nursing**4 QH**

Builds on students' prior exposure to select studies applied to nursing. Discusses and critiques qualitative and quantitative research and the value of each to the practice of nursing and to the health-care field. Examines the importance of research in nursing to both practitioner and consumer. *Prereq.* NUR 1400, NUR 1401, SOA 1100, and senior standing or permission of instructor.

NUR 1503 Advanced Clinical Care**4 QH**

Builds on students' clinical nursing experiences. Focuses on analyzing, synthesizing, and prioritizing solutions to patients' problems, using the case study format. Applies concepts of pathophysiology, nutrition, pharmacotherapeutics, stress, and crisis to acutely ill clients in case simulations. Develops clinical nursing judgment with acutely ill patients in adult, maternal, and child populations. *Prereq.* NUR 1400, NUR 1401, and senior standing.

NUR 1505 Introduction to Leadership and Management of Patient Care**3 QH**

Focuses on the nurse as a leader and manager of patient care. Examines the theoretical base for organizing and facilitating the delivery of efficient and appropriate nursing services to clients and patients across various settings. Explores concepts from nursing, organizational theory, decision-making theory, and leadership and management theory to heighten the nurse's awareness of the human and material resources required to deliver nursing care. Emphasizes the importance of collaborating with a variety of providers. *Prereq.* NUR 1400, NUR 1401, and senior standing.

NUR 1506 Senior Clinical Elective**6 QH**

Provides a transition for senior students as they enter their professional clinical practice. Requires two components, a precepted clinical practicum and a clinical seminar. Assigns each student to a clinical agency according to her/his identified objectives and a faculty assessment of the student's clinical knowledge and skills needs. The student will practice two days per week for one quarter following the preceptor's schedule in the selected clinical site. Encourages students to incorporate off-shift and weekend assignments as is appropriate for the agency. A concurrent clinical seminar, held once a week for two hours and guided by a College of Nursing faculty member, focuses on critical thinking and clinical decision making. *Prereq.* NUR 1500 and senior standing.

NUR 1600 International Health Care Practices**4 QH**

Introduces the student to the ways in which people in developing nations take care of their health. Considers the cultural context of health care practices, viewed within the framework of what people believe about themselves and the world around them; the relationship of individual and cultural belief systems; the role religious and spiritual beliefs play in protection, care, and curing; ideas about food and its relationship to health; the concepts of health education in a belief system; and the ethical issues of health care and resource allocation. *Open to any undergraduate student.*

NUR 1601 International Health Care Delivery Systems**4 QH**

Provides students with an opportunity to learn about health care delivery systems in other countries. Introduces the student to a framework from which to study any health care delivery system. Includes an overview of health care delivery from a variety of perspectives. Investigates the divergence between two third world and developed nations' health care delivery systems. Students study a selected country's health care delivery system in depth. *Open to any undergraduate student.*

NUR 1602 International Health Policy Issues**4 QH**

Presents a critical approach to selected issues in contemporary international health policy. Includes the socioeconomic context in which such policy arises, the endogenous and exogenous factors that shape it, and the strategies that govern its implementation. Examines policies related to a selected issue, such as food

and agriculture, in some depth as a model for the conceptual approach to understanding health policy issues. *Open to any undergraduate student.*

NUR 1606 Women's Health Choices and Decisions**4 QH**

Explores personal health and safety concerns specific to women from menarche to mid-life. By examining personal experiences, students develop their knowledge base and self-awareness; a goal is to empower students to take charge of their health. Seminars investigate self-promotion of health; how to be a knowledgeable consumer; when and how to choose a provider; and care options for fertility regulation, infertility, pregnancy, childbirth, and other conditions specific to women. *Open to any undergraduate student.*

Pharmacy and Health Sciences

Athletic Training

ATP 1000 Introduction to Athletic Training 3 QH

Exposes students to the profession. Introduces basic injury prevention and first aid techniques.

ATP 1100 Prevention and Care of Athletic Injuries 3 QH

Examines the principles in prevention, recognition, management, and rehabilitation of athletic injuries. Focuses on physiological and pathological nature of the injury and discusses the course of action for return to competition. *Prereq.* ATP 1000. *Formerly* HSL 1605.

ATP 1101 Athletic Training Laboratory 1 QH

Discusses the biomechanical and anatomical principles as well as indications and contraindications of the various wrapping and strapping techniques used for athletic injuries. Presents the indications for use and types of protective devices such as braces and splints. Utilizes lab time for applying and developing skills. *Formerly* HSL 1268.

ATP 1110 Fundamentals of Athletic Training 3 QH

Presents the duties and functions of the certified athletic trainer, emphasizing how to prevent and evaluate athletic injuries. Focuses on the athletic trainer's relationship to other allied medical professions. *Formerly* HSL 1605.

ATP 1200 Clinical Athletic Training 4 QH

Introduces the student athletic trainer to the clinical experience. Gives an opportunity to practice the various skills essential for evaluating, treating, and rehabilitating athletic injuries. *Prereq.* ATP 1100 and ATP 1101. *Formerly* HSL 1608.

ATP 1300 Advanced Athletic Training 1 4 QH

Focuses on the evaluating and predisposing conditions of heat illness, head and neck trauma, and lower extremity athletic injuries. *Prereq.* ATP 1100 and ATP 1200. *Formerly* HSL 1609.

ATP 1350 Advanced Athletic Training 2 4 QH

Continues ATP 1300. Focuses on evaluating athletic injuries of the upper extremity, torso, and lower back. Covers how to identify injury and illness of the internal organs. *Prereq.* ATP 1100 and ATP 1300. *Formerly* HSL 1628.

ATP 1390 Athletic Training Practicum 1 3 QH

Offers assignments in field settings related to students' areas of study. Gives students the opportunity to observe and perform professional skills under a certified athletic trainer's supervision. *Prereq.* ATP 1100 and ATP 1200. *Formerly* HSL 1790.

ATP 1400 Therapeutic Modalities in Athletic Training 4 QH

Presents the physical agents used in athletic training with regard to their physiologic effects. Discusses where in the healing process these agents may be used and their theoretical implications. *Prereq.* ATP 1100 and ATP 1200. *Formerly* HSL 1627.

ATP 1490 Athletic Training Practicum 2 3 QH

Same as ATP 1700. *Formerly* HSL 1791.

ATP 1500 Therapeutic Reconditioning 4 QH

Covers principles and objectives inherent in rehabilitating athletic injuries. Discusses orthopedic rehabilitation fundamentals, as well as specific conditioning and reconditioning techniques. Exposes the student to the different types of exercise and equipment used in rehabilitation. Provides laboratory experiences in applying rehabilitation programs using equipment. *Prereq.* ATP 1200 and ATP 1300. *Formerly* HSL 1626.

ATP 1590 Athletic Training Practicum 3 3 QH

Same as ATP 1700. *Formerly* HSL 1792.

ATP 1600 Organization and Administration of Athletic Training Programs 4 QH

Provides students with the knowledge and skills necessary to manage an athletic training facility. Includes topics such as budgeting, facility design, physical examinations, and staffing. *Prereq.* ATP 1100, ATP 1200, and ATP 1300. *Formerly* HSL 1629.

ATP 1690 Athletic Training Practicum 4 3 QH

Same as ATP 1700. *Formerly* HSL 1793.

ATP 1800 Senior Seminar 4 QH

Discusses current topics pertaining to the fields of athletic training and sports medicine. *Prereq.* Senior standing in the athletic training major.

Cardiopulmonary Sciences

CPS 1111 Cardiopulmonary Sciences Seminar 1 1 QH

Introduces the beginning cardiopulmonary sciences student to the various areas of study within the major. Examines the role of each profession in health care delivery. Field trips give students the opportunity to observe professionals in their specific roles. *Formerly* RTH 1111.

CPS 1112 Cardiopulmonary Sciences Seminar 2 1 QH

Continues CPS 1111. *Formerly* RTH 1112.

CPS 1113 Cardiopulmonary Sciences Seminar 3 1 QH

Continues CPS 1112. *Formerly* RTH 1113.

CPS 1211 Practicum in Respiratory Care 4 QH

The first course in a sequence of five designed to provide clinical experience in hospitals. Focuses on respiratory care for noncritical patients. Emphasizes infection control, medical gas administration, humidification of medical gases, aerosol therapy, chest physiotherapy, deep breathing treatments, and the administration of aerosol medications. *Prereq.* CPS 1331, CPS 1301, CPS 1332 concurrently, and CPS 1302 concurrently. *Formerly* RTH 1211.

CPS 1301 Professional Practice Laboratory 1 1 QH

Provides practice in basic care skills through laboratory exercises and simulation of patient-care situations. Lab fee. *Prereq.* CPS 1331 concurrently. *Formerly* RTH 1301.

- CPS 1302 Professional Practice Laboratory 2** 1 QH
Provides students with hands-on experience in working with respiratory therapy equipment. Sets up simulated patient-management problems in the lab to provide problem-solving experience. Lab fee. *Prereq.* CPS 1301, and CPS 1332 concurrently. *Formerly* RTH 1302.
- CPS 1312 Practicum in Respiratory Care** 4 QH
The second course in a sequence of five directly related to the clinical practice of various modalities of respiratory care. Focuses on treating patients with more complex cardiorespiratory disorders. *Prereq.* CPS 1332, CPS 1302, CPS 1433 concurrently, and CPS 1403. *Formerly* RTH 1312.
- CPS 1313 Practicum in Respiratory Care** 6 QH
Provides clinical experience in hospitals. Emphasizes respiratory care for critical patients. Reviews advanced respiratory-care topics such as airway care, mechanical ventilation, and positive end expiratory pressure. *Prereq.* CPS 1433, CPS 1302, CPS 1434 concurrently, CPS 1404 concurrently. *Formerly* RTH 1313.
- CPS 1320 Cardiopulmonary Physiology** 4 QH
Provides detailed information relating to cardiopulmonary physiology in the normal, diseased, and stressed state. Discusses the mechanics of regulatory control and interaction between the cardiovascular and respiratory systems. *Formerly* RTH 1320.
- CPS 1321 Cardiopulmonary Disease** 4 QH
Introduces clinical diagnostic procedures employed in evaluating cardiopulmonary patients and description of the etiology, pathophysiology, diagnosis, and treatment of major cardiopulmonary diseases. *Prereq.* Satisfactory completion of the first-year courses. *Formerly* RTH 1321.
- CPS 1331 Introduction to Patient Care** 4 QH
Provides an opportunity for the student to gain knowledge and understanding of basic patient-care skills, including moving and positioning of patients, infection control, basic observation and assessment skills, and familiarity with the techniques of cardiopulmonary resuscitation. Also provides an opportunity for the development of the student's interpersonal and communication skills. *Formerly* RTH 1331.
- CPS 1332 Introduction to Respiratory Care** 4 QH
Basic to all other professional respiratory therapy courses. Focuses on the theory and application of medical gas administration and humidity/aerosol therapy. *Prereq.* CPS 1331 and PCL 1309 concurrently. *Formerly* RTH 1332.
- CPS 1403 Professional Practice Laboratory 3** 1 QH
Provides students with hands-on experience with respiratory therapy procedures. Sets up simulated patient-management problems in the lab to provide problem-solving experience. Lab fee. *Prereq.* CPS 1302, and CPS 1433 concurrently. *Formerly* RTH 1403.
- CPS 1404 Professional Practice Laboratory 4** 1 QH
Provides students with an opportunity to acquire experience in working with respiratory therapy life support equipment. Sets up simulated critical-care problems in the lab to provide problem-solving experience. Lab fee. *Prereq.* CPS 1403, and CPS 1434 concurrently. *Formerly* RTH 1404.
- CPS 1408 Research Design** 4 QH
Introduces research methodology and scientific writing. Reviews the literature on topics related to the cardiopulmonary sciences. Emphasizes analyzing data and critiquing written research. *Prereq.* Statistics elective. *Formerly* HSL 1408.
- CPS 1414 Clinical Seminar 1** 1 QH
Discusses clinical topics and respiratory-care problems encountered during clinical practice in the hospitals. *Prereq.* CPS 1312 concurrently. *Formerly* RTH 1414.
- CPS 1415 Clinical Seminar 2** 1 QH
Discusses clinical topics and critical-care problems encountered during clinical practice in the hospital. *Prereq.* CPS 1313 concurrently. *Formerly* RTH 1415.
- CPS 1433 Respiratory Care for the Medical and Surgical Patient** 4 QH
Continues the introduction to respiratory therapy, as the didactic portion of beginning clinical experience on noncritical patients. Focuses on respiratory-care problems following major surgery and those problems related to medical patients. *Prereq.* CPS 1332. *Formerly* RTH 1433.
- CPS 1434 Respiratory Care for the Critical Patient** 4 QH
The last in a sequence of three directly related to the theory of respiratory therapy procedures; designed as the didactic portion of clinical experience on critical patients. Focuses on respiratory-care problems encountered with patients in intensive care units. *Prereq.* CPS 1433. *Formerly* RTH 1434.
- CPS 1435 Introduction to Perinatal/Pediatric Respiratory Care** 2 QH
Provides the student with the opportunity to acquire knowledge and understanding of human cardiopulmonary development from the time of conception through childhood years. Emphasizes normal as well as abnormal manifestations of pregnancy, labor, and the process of delivering. Examines methods and techniques of assessment and delivery of respiratory care related to the pediatric patient's pathophysiology of cardiopulmonary disease. *Prereq.* CPS 1434. *Formerly* RTH 1435.
- CPS 1505 Cardiopulmonary Laboratory Practice** 1 QH
The lab portion of Cardiopulmonary Laboratory Technology. Focuses on the techniques of pulmonary functions testing, blood gas analysis, and cardiovascular testing commonly done in the clinical setting. Lab fee. *Prereq.* CPS 1535 concurrently. *Formerly* RTH 1505.
- CPS 1510 Perfusion Technology Practicum 1** 6 QH
Provides perfusion technology students with the opportunity to develop, practice, and master skills required to perform extracorporeal circulation procedures. Also includes, but is not limited to, current methods in autotransfusion, myocardial preservation, and intra-aortic balloon support. *Prereq.* CPS 1570. *Formerly* RTH 1510.
- CPS 1511 Practicum in Critical Care 1** 4 QH
Allows the student to select an area of emphasis from among the following: intensive care units, neonatal-pediatrics, or extracorporeal membrane oxygenation. During the practicum courses, provides students with an opportunity to work in their specialty areas. *Prereq.* CPS 1574 and CPS 1578. *Formerly* RTH 1511.

CPS 1512 Practicum in Critical Care 2	4 QH	CPS 1576 Neonatal Respiratory Care	4 QH
Continues CPS 1511. <i>Prereq. CPS 1511. Formerly RTH 1512.</i>		Provides the student with an understanding of the methods and techniques of respiratory therapy for neonatal patients.	
CPS 1515 Perfusion Technology Practicum 2	6 QH	CPS 1578 Advanced Medical Monitoring	4 QH
Continues CPS 1510. <i>Prereq. CPS 1514, CPS 1571, and CPS 1572. Formerly RTH 1515.</i>		Provides students with an opportunity for an in-depth exposure to the theory and application of physiologic monitoring systems and their use in critical-care settings. <i>Prereq. CPS 1574. Formerly RTH 1576.</i>	
CPS 1516 Advanced Clinical Seminar 1	1 QH	CPS 1612 Exercise Physiology 1	4 QH
Complements CPS 1571. Discusses current clinical problems related to life-support systems problems encountered in the hospital. <i>Prereq. CPS 1571 concurrently. Formerly RTH 1516.</i>		Studies the immediate and long-range effects of exercise on the human body, emphasizing the cardiovascular and respiratory systems, muscles, and metabolism. Includes physical fitness, body composition, and selected components of motor performance. Covers assessment techniques and training principles. Introduces indirect open-circuit calorimetry and EKG monitoring. <i>Formerly HSL 1612.</i>	
CPS 1517 Advanced Clinical Seminar 2	1 QH	CPS 1613 Laboratory in Exercise Testing and Prescription	4 QH
Complements a professional elective taken concurrently. Discusses current clinical problems and research related to problems encountered in the hospital. <i>Prereq. CPS 1572 concurrently. Formerly RTH 1517.</i>		Presents a practicum in assessing cardiovascular function, muscular strength, muscular endurance, flexibility, and body composition. Gives students the opportunity to prescribe exercise programs through volunteer work as exercise test technicians and exercise leaders in fitness classes. <i>Prereq. CPS 1612. Formerly HSL 1613.</i>	
CPS 1518 Advanced Clinical Seminar 3	1 QH	CPS 1614 Electrocardiography	4 QH
Complements CPS 1511. Discusses current clinical problems and emphasizes research related to critical-care problems. <i>Prereq. CPS 1511 concurrently. Formerly RTH 1518.</i>		Studies basic and intermediate electrocardiography, including cardiac function, lead systems, rate, rhythm, axis, infarction, ischemia, hypertrophy, effects of cardiovascular drugs, and effects of exercise. <i>Prereq. CPS 1613. Formerly HSL 1614.</i>	
CPS 1519 Advanced Clinical Seminar 4	1 QH	CPS 1617 Programming for Cardiovascular Health & Exercise	4 QH
Continues CPS 1518. Complements CPS 1512. <i>Prereq. CPS 1512 concurrently. Formerly RTH 1519.</i>		Focuses on the design, delivery, and evaluation of fitness and wellness programs to individuals and groups in a corporate, commercial, or a clinical setting. <i>Prereq. CPS 1612 and HSL 1282.</i>	
CPS 1535 Cardiopulmonary Laboratory Techniques	4 QH	CPS 1632 Health Science Education	4 QH
Provides the student with an opportunity to gain knowledge and background in principles, theory, and procedures encountered in a clinical cardiopulmonary lab. Focuses on the physiological foundations of cardiopulmonary testing. <i>Prereq. CPS 1321 and permission of instructor. Formerly RTH 1535.</i>		Studies the systems approach to teaching health science. Covers developing instructional goals based on needs assessments, behavioral learning objectives, instructional strategies, and evaluation instruments. Emphasizes using criterion-referenced measurement strategies to evaluate mastery of clinical skills.	
CPS 1570 Fundamentals of Perfusion Technology	4 QH	CPS 1633 Student Teaching and Seminar	4 QH
Applies biologic, pharmacologic, and physical principles to extracorporeal cardiopulmonary support. Focuses on the basic theory and instrumentation of perfusion technology, emphasizing circuit design and function, oxygenator theory, pump dynamics, blood recovery and autotransfusion procedures, myocardial protection techniques, intraaortic counterpulsation, aseptic techniques, and surgical procedures. Provides an opportunity to work with perfusion equipment and to develop the psychomotor skills necessary to implement perfusion procedures. Lab. <i>Formerly RTH 1570.</i>		Involves part-time participation (twelve hours per week) in a supervised learning experience that provides practice with didactic, laboratory, or clinical teaching. Gives students an opportunity to demonstrate, evaluate, and develop their teaching skills. Discusses problems encountered in the classroom, laboratory or hospital through one-hour weekly seminars. <i>Formerly RTH 1633.</i>	
CPS 1571 Advanced Life Support Systems 1	4 QH	CPS 1634 Rehabilitation of Patients with Respiratory Disorders	4 QH
Introduces students to selected techniques of advanced life support applied to the critically ill patient. <i>Prereq. CPS 1434. Formerly RTH 1571.</i>		Applies a broad definition of rehabilitation to the life situations of patients with respiratory disorders. Gives students the opportunity to learn specific skills that address the recognition and management of acute and chronic problems. Develops model systems of psychosocial as well as physical support based on these skills. Open to students in health or human service disciplines who have had clinical or field experience. <i>Formerly RTH 1634.</i>	
CPS 1572 Perfusion Technology	4 QH		
Introduces students specializing in perfusion technology to the theory, principles, and concepts of cardiovascular perfusion. <i>Prereq. CPS 1571. Formerly RTH 1572.</i>			
CPS 1574 Advanced Clinical Physiology	4 QH		
Provides respiratory therapy students with an opportunity for an in-depth exposure to medical physiology, based on the concept of the homeostatic state and its application to the clinical setting. <i>Prereq. PAH 1204 and permission of instructor. Formerly RTH 1574.</i>			

CPS 1635 Practicum in Pediatric Pulmonary Rehabilitation 1 QH

Involves counselorship under medical direction at a one-week summer camp for children with severe pulmonary disorders. Requires students to apply skills acquired in CPS 1634 in residential camp situation and to respond to medical or psychosocial problems in a manner consistent with current methods in his/her discipline. Involves group and individual discussions with the instructor to clarify insights and experiences. Requires daily case reports to document the learning process. *Prereq.* CPS 1634 or permission of instructor; enrollment limited. Formerly RTH 1635.

CPS 1641 Fundamentals of Cardiac Catheterization 4 QH

Covers cardiovascular technology and basic concepts such as medical aseptic technique. Introduces concepts related to cardiac output studies, shunt determinations, and electrophysiology. Examines the fundamental principles of intracardiac waveforms and cardiac catheterization. Formerly RTH 1641.

CPS 1700 Internship in Cardiovascular Health and Exercise 12 QH

Provides commercial, corporate, or clinical experience in exercise testing, exercise prescription and leadership, and client education and counseling in a supervised setting. Students must successfully complete 360 hours of internship experience in addition to other written assignments. *Prereq.* Completion of quarter 9 in the cardiovascular health and exercise curriculum. Formerly HSL 1800/1801.

CPS 1701 Minor Internship in Cardiovascular Health and Exercise 6 QH

Provides commercial, corporate, or clinical experience in exercise testing, exercise prescription and leadership, and client education and counseling in a supervised setting for students minoring in cardiovascular health and exercise. Students must successfully complete 200 hours of internship experience in addition to other written assignments. *Prereq.* HSL 1612, HSL 1613, and HSL 1614. Formerly HSL 1801.

CPS 1801 Directed Independent Study 1 2 QH

Offers directed study in a student's major wherein in-depth investigation of a special interest area is undertaken. *Prereq.* CPS 1511 concurrently. Formerly RTH 1801.

CPS 1802 Directed Independent Study 2 2 QH

Offers directed study in a student's major wherein in-depth investigation of a special interest area is undertaken. *Prereq.* CPS 1512 concurrently. Formerly RTH 1802.

CPS 1810 Continuation of Clinical 0 QH

This six-week noncredit clinical course provides perfusion technology students with the opportunity to clear grades of I (Incomplete) in CPS 1515, Practicum in Perfusion Technology 2. At the end of the six-week period, students will be reevaluated using the criteria developed for CPS 1515, and I grades will be changed to the grades earned at that time. Formerly RTH 1810.

CPS 1866 Special Problems 4 QH

Discusses current issues and concepts in cardiovascular health and exercise. Requires an independent research paper. *Prereq.* Junior and senior cardiovascular health and exercise majors. Formerly HSL 1866.

Counseling Psychology, Rehabilitation, and Special Education**CRS 1030 Introduction to Emotional Disturbances in Children 4 QH**

Reviews emotional processes that interfere with learning activities; studies approaches used to deal with behavioral disorders. Emphasizes classroom management techniques, use of consultation, and parent-teacher interaction.

CRS 1200 Introduction to Special Education 4 QH

Surveys the characteristics and the social, emotional, and educational adjustment of individuals with special needs. Evaluates the effects of societal attitudes and perceptions on individuals with special needs in a variety of settings. Reviews legislation and current trends, with an emphasis on integration and full inclusion of individuals with special needs in regular education settings and also in the community.

CRS 1300 Introduction to Learning Disabilities 4 QH

Surveys behavioral characteristics of children who present specific deficits in perceptual, integrative, or expressive processes that impair learning efficiency. Emphasizes student evaluation, development of curriculum materials, and adaptation of teaching methods.

CRS 1301 Diagnostics in Special Education 4 QH

Focuses on developing competence in the formal and informal assessment of children's learning needs. Also emphasizes observing, recording, and analyzing children's behavior and learning environments. *Prereq.* CRS 1200 and CRS 1300.

CRS 1302 Methods and Materials of Teaching in Special Education 4 QH

Focuses on the following areas of development and implementation of individualized educational plans; task analysis; adaptation and selection of materials; strategies in applied classroom management techniques; and adaptation and selection of materials and strategies in language arts, mathematics, and perceptual-motor skills. *Prereq.* CRS 1200, CRS 1300, CRS 1301, or senior standing.

CRS 1304 Socio-Psycho Dynamics of Family Life 4 QH

Introduces and surveys the internal and external dynamics of family life. Examines the significance of such dynamics to the mental health of the special needs child. Explores approaches to working with parents in home-school relationships, as well as the effects of disability on the family.

CRS 1305 Psychology of the Mentally Retarded 4 QH

Analyzes the etiology, nature, and needs of the retarded individual, emphasizing cognitive and psychosocial development. Explores the implications of these characteristics for life-span management in conjunction with parental and community attitudes and involvement.

CRS 1314 Introduction to Counseling 4 QH

Surveys major theoretical approaches to counseling. Provides training and practice in listening skills to aid in the development of facilitative responses. Combines didactic presentations and experiential activities to assist students in understanding and implementing a variety of counseling approaches.

CRS 1315 Introduction to Etiology and Development of Special Needs 4 QH

Presents an overview of the etiology and development of disabling conditions, current issues in these areas, problems associated with drug and substance abuse and other high risk factors, and curriculum strategies for dealing with early childhood, elementary, and middle school children with special needs conditions. Requires students to develop a report and research paper on the etiology of a specific disabling condition.

CRS 1316 Introduction to Assessment, Program Planning, and Implementation in Special Education 4 QH

Presents an overview of the federal and state laws pertaining to assessment in special education, and an overview of the theories and strategies for integrating children with mild and moderate special needs. Requires students to administer three education assessments, summarize the results in a case report, propose a program of education intervention, and identify methods to facilitate and monitor its implementation.

CRS 1317 Student Teaching and Seminar in Special Education 8 QH

Allows for full-time participation in a University-arranged and supervised school program. Gives the student the opportunity to analyze the teaching of and the learning by special-needs students and to demonstrate, evaluate, and develop teaching skills in a variety of classroom settings. *Prereq. Advanced professional sequence with minimum 2.0 QPA both overall and in teaching major.*

CRS 1500 Mental Health 4 QH

Investigates emotional health and well-being as they relate to total health, with emphasis on factors that influence emotional behavior. Includes various approaches to emotional health in school programs and the community.

CRS 1503 Human Sexuality and Family Dynamics 4 QH

Examines sexuality from a physical, psychological, social, historical, and cultural perspective. Considers sexual needs and concerns about sexuality at various stages in life, including a variety of approaches to sex education in schools, community, and the family. *Prereq. Middler standing or above.*

CRS 1510 Health Counseling 4 QH

Identifies physical, mental, emotional, and social health problems, remedial procedures, and counseling techniques to aid health educators in dealing more effectively with various health issues. *Prereq. Junior standing or above.*

CRS 1800 Directed Study 4 QH

This experience is provided for the student whose unique academic needs or interests cannot be adequately satisfied in any of the scheduled courses of the department. Directed study requires approval of the supervising faculty member and of the dean's office of the college. Approval forms must be submitted to the dean's office during the quarter prior to registration for the directed study. *Prereq. Permission of instructor.*

HSL 1101 Intermediate Swimming 1 QH

Focuses on basic and advanced swimming skills, with emphasis on form and efficiency. *Prereq. HSL 1100 or equiv.*

HSL 1106 Beginning Scuba 2 QH

Focuses on basic skin-diving and scuba-diving skills, with emphasis on safety. *Prereq. HSL 1101 or equiv.*

HSL 1107 Sailing 1 QH

Focuses on basic skills in sailing.

HSL 1109 Beginning Gymnastics 1 1 QH

Introduces, in a coeducational approach, basic skills in floor exercise, vaulting, balance beam, parallel bars, uneven bars, high bar, and rings.

HSL 1110 Women's Gymnastics 2 1 QH

Focuses on knowledge and skills necessary to perform the beginning compulsory routines on the balance beam, floor exercise, uneven bars, and vaulting. *Prereq. HSL 1109.*

HSL 1112 Men's Gymnastics 2 1 QH

Focuses on skills and knowledge necessary to perform beginning compulsory routines on the high bar, side horse, rings, floor exercise, parallel bars, and vaulting horse. *Prereq. HSL 1109.*

HSL 1114 Badminton 1 QH

Focuses on basic badminton strokes, concepts, rules, strategies, and game play.

HSL 1116 Tennis 1 QH

Focuses on basic tennis strokes, concepts, rules, strategies, and game play.

HSL 1121 Beginning Self-Defense 1 QH

Surveys the principles and fundamental skills at the beginning and intermediate levels.

HSL 1126 Karate 1 1 QH

Focuses on fundamental techniques of unarmed combat for self-defense using the punches, kicks, and blocks of Tae Kwan Do/Karate.

HSL 1127 Karate 2 1 QH

Continues HSL 1126, with progression to more complex techniques and combinations of punches, kicks, and blocks related to Tae Kwan Do/Karate. *Prereq. HSL 1126.*

HSL 1129 Beginning Ice Skating 1 QH

Focuses on recreational ice-skating skills for beginners.

HSL 1130 Figure Skating 1 QH

Focuses on beginning and intermediate figure-skating skills. *Prereq. HSL 1129 or permission of instructor.*

HSL 1131 Yoga 1 QH

Introduces yoga skills and techniques for men and women at the beginning level.

HSL 1132 Weight Training 1 QH

Introduces the principles and use of resistive exercises: isotonic exercise (weights), isometric exercise, and the appropriateness of each.

Health, Sport, and Leisure Studies

HSL 1100 Beginning Swimming 1 QH

Focuses on basic swimming skills for non-swimmers, with emphasis on personal water safety.

HSL 1133 Physical Conditioning	1 QH	HSL 1156 Ballet 1	1 QH
Focuses on assessing one's personal physical fitness level, with emphasis on establishing a personal exercise regimen based on scientific principles of training. Utilizes special sections for different mediums of exercise, such as aerobic dance techniques, running, and circuit training.		Introduces ballet fundamentals, with emphasis on alignment.	
HSL 1134 Aerobic Exercise and Dance	1 QH	HSL 1157 Ballet 2	1 QH
Focuses on aerobic fitness, with strong emphasis on concepts of exercise safety and conditioning.		Continues HSL 1156, with emphasis on developing lyrical style. <i>Prereq.</i> HSL 1156 or equiv.	
HSL 1135 Yoga 2	1 QH	HSL 1159 Jazz Dance 1	1 QH
Focuses on refinement of poses learned in HSL 1131. Introduces more advanced standing and inverted poses, balances, and back bends. <i>Prereq.</i> HSL 1131 or equiv.		Introduces the fundamentals of jazz dance, with emphasis on alignment.	
HSL 1138 Beginning Skiing	1 QH	HSL 1160 Jazz Dance 2	1 QH
Focuses on fundamental techniques of downhill skiing. Lab fee.		Continues techniques introduced in HSL 1159, with emphasis on developing jazz dance style. <i>Prereq.</i> HSL 1159 or equiv.	
HSL 1139 Intermediate Skiing	1 QH	HSL 1163 Ballroom Dance	1 QH
Focuses on downhill skiing, including intermediate and advanced techniques. Emphasizes skill development. Lab fee. <i>Prereq.</i> HSL 1138.		Introduces traditional and contemporary partner dancing.	
HSL 1140 Basketball	1 QH	HSL 1164 Ballroom Dance 2	1 QH
Focuses on knowledge and skills appropriate for playing basketball at the beginning level.		Continues HSL 1163 with progression into more complex dance steps, partnering techniques, and amalgamations. Expands upon dances taught in HSL 1163 and introduces additional ballroom dances. <i>Prereq.</i> HSL 1163.	
HSL 1142 Volleyball	1 QH	HSL 1167 Beginning Racquetball	1 QH
Focuses on knowledge and skills appropriate for playing volleyball at the beginning level.		Focuses on knowledge and skills appropriate to play racquetball at the beginning level.	
HSL 1146 Softball	1 QH	HSL 1173 Beginning Track and Field	1 QH
Focuses on knowledge and skills appropriate for playing softball at the beginning level.		Focuses on the fundamental skills in the various track and field events.	
HSL 1148 Women's Lacrosse	1 QH	HSL 1254 First Aid	2 QH
Focuses on knowledge and skill appropriate for playing lacrosse at the beginning level.		Focuses on emergency care procedures recommended for home, school, and community, including cardiopulmonary resuscitation (CPR). Emphasizes practices endorsed by the American Red Cross.	
HSL 1149 Men's Lacrosse	1 QH	HSL 1258 Elementary School Activities	3 QH
Focuses on knowledge and skills appropriate to play lacrosse at the beginning level.		Focuses on introductory knowledge and skills necessary for teaching physical education to children of elementary school age. Gives students the opportunity to learn about children's performance and appropriate teaching techniques through observation and actual experience in off-campus schools and learning centers. Partially satisfies the prepracticum requirements for teacher certification at the K-9 level.	
HSL 1150 Soccer	1 QH	HSL 1259 Secondary School Activities	3 QH
Focuses on knowledge and skill appropriate to play soccer at the beginning level.		Studies physical activity appropriate for secondary school students' level of development and interest. Gives students the opportunity to learn about pupils' performance and appropriate teaching techniques through observation and actual experience in off-campus schools and learning centers. Partially satisfies the prepracticum requirements for teacher certification at the grades 5-12 level.	
HSL 1151 Movement Education	1 QH	HSL 1261 Anatomy and Physiology 1	4 QH
Focuses on concepts and techniques in movement education and exploration for elementary school educators.		Focuses on gross anatomy and physiology of the human skeletal, joint, nervous, and muscular systems.	
HSL 1153 Modern Dance 1	1 QH	HSL 1263 Motor Development and Learning	4 QH
Introduces modern dance technique and style.		Studies the development of motor skills from early childhood through adolescence. Considers age expectations for perceptual motor behavior. Focuses on how information processing is	
HSL 1154 Modern Dance 2	1 QH		
Continues HSL 1153, with progression to more complex modern dance techniques and combinations. <i>Prereq.</i> HSL 1153 or equiv.			
HSL 1155 Modern Dance 3	1 QH		
Continues HSL 1154, with progression into the expressive and choreographic use of modern dance techniques. <i>Prereq.</i> HSL 1154 or equiv.			

involved in motor learning and performance. Applies basic research data to learning and executing skill in a variety of sport settings.

HSL 1265 Early Childhood Development 4 QH

Studies the development of fundamental motor patterns (run, catch, kick, strike, jump, throw) from ages 0 to 5 years, including perceptual-motor relations operating in vision, audition, and proprioception.

HSL 1266 Physical Conditioning Programming 2 QH

Focuses on how to design and deliver instruction related to physical conditioning and exercises. *Prereq.* HSL 1132 and HSL 1133.

HSL 1268 Basic Athletic Training Laboratory 1 QH

Discusses the biomechanical and anatomical principles as well as indications and contraindications for application of the various wrapping and strapping techniques involved with athletic injuries. Presents the indications for use and types of protective devices (braces, splints, and so forth). Utilizes lab time for practical application and development of skills. *Prereq.* HSL 1605 taken concurrently.

HSL 1281 Current Issues in Health 4 QH

Explores topics of current interest, which may include emotional health, nutrition, fitness, sexuality, drug use, disease, consumer issues, and environmental issues. Emphasizes the needs of the participants.

HSL 1282 Wellness 4 QH

Explores the concept of wellness, examining behaviors and lifestyle choices that lead to a high level of physical, emotional, and spiritual well-being. Covers assessment of health risk, behavioral change, lifestyle analysis, the life cycle, and stress management through self-analysis.

HSL 1285 Health Concerns of Youth 4 QH

Applies health concepts to assist youth in reaching a higher level of wellness through preventive measures. Identifies and deals with significant health concerns as they relate to health professionals, teachers, and adults. Partially satisfies the prepracticum requirements for teacher certification grade levels 5–12.

HSL 1286 Nutrition 4 QH

Offers the student the opportunity to learn and evaluate nutrition information both as a consumer and a future educator. Explains the chemical, biological, and physiological bases of nutrition.

HSL 1300 Swimming Analysis 2 QH

Focuses on theory, analysis techniques, and teaching methods in swimming. *Prereq.* HSL 1101 or permission of instructor.

HSL 1301 Analysis and Coaching of Men's Gymnastics 2 QH

Focuses on skills analysis and coaching of men's gymnastics, with emphasis on teaching methods, new trends, and judging. *Prereq.* HSL 1113.

HSL 1302 Analysis and Coaching of Badminton 2 QH

Focuses on analysis of performing, teaching, and coaching in badminton. *Prereq.* HSL 1115.

HSL 1303 Analysis and Coaching of Tennis 2 QH

Focuses on analysis of performance and methods of teaching in tennis. *Prereq.* HSL 1117.

HSL 1306 Analysis and Coaching of Track/Field 2 QH

Focuses on advanced skills analysis and coaching techniques for selected track and field events. Emphasizes analysis of common movement patterns, teaching methods, and coaching techniques. *Prereq.* HSL 1135 or equiv.

HSL 1309 Analysis and Coaching of Basketball 2 QH

Focuses on the basic techniques and responsibilities of coaching interscholastic and intercollegiate basketball, including advanced skills analysis, position and team play, conditioning, practice organization, and team management. *Prereq.* HSL 1140.

HSL 1313 Analysis and Coaching of Soccer 2 QH

Focuses on the basic techniques and responsibilities of coaching intramural, interscholastic, and intercollegiate soccer, including advanced skills analysis, position and team play, conditioning, practice organization, and team management. *Prereq.* HSL 1150.

HSL 1315 Analysis and Coaching of Volleyball 2 QH

Focuses on the basic techniques and responsibilities of coaching intramural, interscholastic, and intercollegiate volleyball, including advanced skills analysis, position and team play, conditioning, practice organization, and team management. *Prereq.* HSL 1142.

HSL 1319 Analysis and Coaching of Softball 1 QH

Focuses on basic techniques and responsibilities of coaching intramural, interscholastic, and intercollegiate softball, including advanced skills analysis and management. *Prereq.* HSL 1146.

HSL 1320 Analysis and Coaching of Gymnastics 2 QH

Focuses on skills analysis and coaching of women's gymnastics, with emphasis on appropriate teaching methods and new trends. *Prereq.* HSL 1111.

**HSL 1325, HSL 1326, HSL 1327
Dance Rehearsal and Performance 1, 2, 3 1 QH each**

Gives students the opportunity to develop skill in performance. Also allows students to choreograph, stage, and perform an original work or perform in the original work of a guest or faculty choreographer. *Prereq.* Permission of instructor.

HSL 1400 Organizational Behavior 3 QH

Studies human behavior in groups through lectures, reading, and projects. Concentrates on management skills and employment legislation.

HSL 1401 Program Planning in Recreation 4 QH

Examines in-depth the steps in planning recreation programs in concert with practical experience.

HSL 1403 Concepts of Leisure: Sociopsychological Perspectives 4 QH

Explores the various sociopsychological perspectives of leisure and the relations of mores, social structure, roles, values, and personality to leisure expression. Investigates other pertinent social and environmental factors that contribute to the phenomenon of leisure.

HSL 1406 Internship Seminar 1 QH

Offers preparation for professional field assignment in a leisure-service setting. Focuses on identification and assessment of student career goals, analysis of previous volunteer and/or employment experience, professional involvement, and facilitation of the internship placement process.

HSL 1408 Research Methods	4 QH	HSL 1500 Mental Health	4 QH
Studies basic statistics, the use of experimental and quasi-experimental design, sampling, instrumentation, data collection, and analysis as applied in recreation and leisure studies.		Investigates emotional health and well-being as they relate to total health, with emphasis on factors that influence emotional behavior. Includes various approaches to emotional health in school programs and the community.	
HSL 1409 Research Applications	4 QH	HSL 1501 Epidemiology	4 QH
Examines the use of research methods in selected professional applications ranging from the ongoing research of faculty to student-originated studies.		Introduces concepts and skills related to using epidemiology as a basis for understanding community health problems and planning health promotion and disease prevention programs. <i>Prereq.</i> HSL 1506.	
HSL 1410 Senior Seminar in Contemporary Issues and Trends in Recreation and Leisure	4 QH	HSL 1502 Communicable and Degenerative Diseases	4 QH
Examines and discusses contemporary issues and trends in the field of recreation and leisure. Focuses on critical aspects of leisure services: legislation, consumer advocacy, professional development, research, and innovations for the improvement of service delivery.		Focuses on the disease immunity process, with emphasis on prevalent communicable diseases in the United States today and their transmission. Also studies chronic diseases, cardiovascular diseases, cancer, diabetes, and other constitutional and degenerative diseases and disorders that affect the nation's health.	
HSL 1421 Management of Recreation and Physical Education Programs	4 QH	HSL 1503 Human Sexuality and Family Dynamics	4 QH
Focuses on management procedures of recreation and physical education facilities operations. Emphasizes area and facility design, personnel policies, and problem solving related to administration and management.		Examines sexuality from a physical, psychological, social, historical, and cultural perspective; needs and concerns about sexuality at various stages in life, including a variety of approaches to sex education in schools, community, and the family. <i>Prereq.</i> <i>Middler standing or above.</i>	
HSL 1422 Program Evaluation in Recreation	4 QH	HSL 1504 Longevity and Aging	4 QH
Examines comprehensive systems for evaluating program effectiveness as it relates to the consumer of recreation services. Emphasizes developing an evaluation system for an agency of the student's choice. Draws case studies from the public, non-profit, and commercial sectors.		Studies the biological, psychological, and sociological aspects of human aging. Considers the importance of one's current lifestyle in relation to the phenomenon of longevity and the quality of life.	
HSL 1423 Commercial Recreation Marketing	4 QH	HSL 1506 Evolving Patterns of Community Health Education	4 QH
Examines commercial and private sector recreation services. Relates case studies, workshops, and practical problems to managing leisure opportunities for resorts, country clubs, theme parks, tourism, sports clubs, manufacturing and merchandising, and industrial recreation.		Analyzes principles of community health, with emphasis on contemporary local, national, and international organizations for meeting health problems. Considers health care delivery, consumer health issues, environmental health, community resources, and the role of health education in the community.	
HSL 1426 Budget Analysis	4 QH	HSL 1507 Research Seminar	2 QH
Focuses on the study and use of analytical techniques that can improve budgeting decisions. Considers cost-effectiveness and benefit-cost analysis, efficiency measures, and pricing for solutions to capital and operating-budget problems in the non-profit and commercial recreation sectors.		Introduces research and scientific writing, culminating in a research project in an area of special interest. <i>Prereq.</i> ED 1306.	
HSL 1427 Survey of Recreation Facilities	3 QH	HSL 1508 Senior Seminar	2 QH
Studies fundamental management, administration, and construction concepts for a wide variety of facilities such as parks, centers, arenas, camps, and marinas.		Discusses current problems and new developments as they relate to health education in school and in a variety of community settings. <i>Prereq.</i> HSL 1507.	
HSL 1463 Overview of Physical Disabilities	4 QH	HSL 1509 Organization and Administration of Health Education Programs	4 QH
Offers a holistic and humanistic approach to people with physical disabilities, including amputations, traumatic conditions, sensory impairments, and neurological, orthopedic, and cardiovascular disorders. Studies rehabilitation procedures and treatment, adjunctive therapies, prosthetics, orthotics, assistive devices, and personal care techniques.		Examines principles and methods of organization and administration of school and community health education programs. Covers ethics, personnel, budget, facility management, and priorities.	
HSL 1467 Social and Psychological Impacts of Illness and Disabilities	4 QH	HSL 1510 Health Counseling	4 QH
Explores relevant issues related to disability such as societal attitudes, self-concept, coping, family, grieving, and life restructuring through a mixture of lectures, group discussion, guest speakers, and films. Examines self in the role of change agents and care providers. <i>Prereq.</i> HSL 1463.		Identifies physical, mental, emotional, and social health problems; remedial procedures; and counseling techniques to aid health educators in dealing more effectively with various health issues. <i>Prereq.</i> <i>Junior standing or above.</i>	
		HSL 1511 Independent Study 1	1 QH
		HSL 1512 Independent Study 2	2 QH
		HSL 1513 Independent Study 3	3 QH

- HSL 1514 Independent Study 4** **4 QH**
Provides the student with an opportunity for concentrated planning and research in a topic area of health, sport, or leisure. Requires student to submit outline of proposed study.
- HSL 1516 Drug Use and Abuse** **4 QH**
Explores the use and abuse of drugs in our society, including prescription and OTC drugs, alcohol, and tobacco. Examines physiological, psychological, and sociological effects of drugs on humans.
- HSL 1585 Teaching Procedures in School and Community Health Education** **4 QH**
Introduces the prospective health educator to health education curriculum, techniques of planning, and pertinent methods and materials in school and community health education. Partially satisfies the pre-practicum requirements for teacher certification at grade levels 5–12. *Prereq.* ED 1104 and HSL 1285.
- HSL 1600 Psychology of Sport** **2 QH**
Analyzes the psychological behavioral patterns and deviations of sports participants, including spectators and coaches. Emphasizes emotions, motivation, competition, and learning factors. Discusses current sports highlights. *Prereq.* Physical education major or permission of instructor.
- HSL 1601 Sociology of Sport** **2 QH**
The study of sport as a social institution, including theories explaining its role in society. Considers social stratification, politics, economics, violence, women, race, mass media, and competition.
- HSL 1602 Theory of Coaching** **2 QH**
Analyzes learning principles, sociology, and psychology as applied to coaching individual, dual, and team sports. Presents techniques and standards of squad recruitment, organization, leadership, and coaching ethics.
- HSL 1603 Theory of Play** **2 QH**
Examines the nature of play and cross-cultural patterns of play. Investigates selected theories of play, including Huizinga, Caillois, Sutton-Smith, and Lee.
- HSL 1605 Basic Athletic Training** **3 QH**
Studies preventing, managing, and rehabilitating athletic injuries. Discusses the scientific basis of conditioning and psychogenic factors involved in athletics and sports medicine.
- HSL 1608 Clinical Athletic Training** **2 QH**
Introduces the student athletic trainer to clinical experience with an opportunity to practice the various skills for evaluation and treatment of the injured athlete. *Prereq.* HSL 1605.
- HSL 1609 Advanced Athletic Training** **4 QH**
Focuses on the evaluating and predisposing conditions relating to heat illness, head and neck trauma, and athletic injuries. *Prereq.* HSL 1605.
- HSL 1610 Anatomy and Physiology 2** **4 QH**
Examines gross anatomy and physiology of the human cardiovascular, respiratory, digestive, urinary, and endocrine systems. Also covers metabolism, calorimetry, and other applied topics. *Prereq.* HSL 1261.
- HSL 1611 Kinesiology** **4 QH**
Investigates science of human motion and anatomic and mechanical principles as they relate to an understanding of skillful, efficient, and purposeful human motion. Examines the internal and external forces acting on a human body and their effects. *Prereq.* HSL 1261.
- HSL 1612 Physiology of Exercise** **4 QH**
Studies the immediate and long-range effects of exercise on the human body, with emphasis on the cardiovascular and respiratory systems, muscles, and metabolism; physical fitness, body composition, and selected components of motor performance/assessment techniques and training principles. Introduces indirect open-circuit calorimetry and EKG monitoring. *Prereq.* HSL 1610.
- HSL 1613 Laboratory in Exercise Testing and Prescription** **4 QH**
Presents a practicum in assessment of functional cardiovascular, muscular strength, muscular endurance, flexibility, and body composition. Gives students the opportunity to prescribe exercise programs used to improve functions through volunteer work as an exercise test technician and exercise leader in a fitness class. *Prereq.* HSL 1612.
- HSL 1614 Electrocardiography** **4 QH**
Studies basic and intermediate electrocardiography, including cardiac function, lead systems, rate, rhythm, axis, infarction, ischemia, hypertrophy, effects of cardiovascular drugs, and effects of exercise. *Prereq.* HSL 1612.
- HSL 1615 Critical Teaching Skills** **4 QH**
Analyzes direct and indirect, verbal and nonverbal teaching methods for classroom and activity teaching, using techniques such as microteaching, peer teaching, and simulation. Examines techniques for measuring teacher behavior, such as interaction analysis. Requires a lab experience in an education setting. Partially satisfies prepracticum requirements for teacher certification. *Prereq.* HSL 1258 or HSL 1259; prepracticum experience.
- HSL 1616 Curriculum Development** **3 QH**
Focuses on basic foundations of curriculum development. Stresses fundamental principles and guides to curriculum organization, format, and evaluation. Includes experience using the taxonomies of education objectives and survey of existing curricula and current curriculum trends.
- HSL 1625 Senior Seminar** **4 QH**
Provides an opportunity for senior students to discuss pertinent new topics and concepts in sports medicine. *Prereq.* Permission of instructor.
- HSL 1626 Therapeutic Reconditioning for Athletic Training** **4 QH**
Covers principles and objectives inherent in the rehabilitation process of athletic injuries. Discusses basic rehabilitation fundamentals, as well as specific conditioning and reconditioning techniques. Exposes the student to the different types of exercise, as well as the different rehabilitative equipment used in a rehabilitation program. Provides laboratory experiences in the application of exercise programs and use of equipment. *Prereq.* HSL 1627.
- HSL 1627 Therapeutic Modalities for Athletic Training** **4 QH**
Presents physical agents used in athletic training with regard to their physiological effects, where in the healing process they may be used, and all indications and contraindications for use. Utilizes laboratory experiences in application of those physical agents. *Prereq.* HSL 1605.

- HSL 1628 Advanced Athletic Training 2** 4 QH
Continues HSL 1609. Focuses on injuries of upper extremity, torso, lower back, and internal organs. *Prereq.* HSL 1609.
- HSL 1629 Organization and Administration of Athletic Training** 4 QH
Studies the management of athletic training facilities. Focuses on issues such as budget, physical examinations, staff, equipment, and facilities. *Prereq.* HSL 1609.
- HSL 1777 Honors Adjunct** 1 QH
To be added to any four-credit course in the department when approved by the Honors Committee of Boston-Bouv  . Once approved, the adjunct information is forwarded to the honors office for dissemination to the honors membership. Allows enrollment an unlimited number of times as an adjunct to any health, sport, and leisure studies course at different times during a given academic year.
- HSL 1790 Athletic Training Practicum 1** 3 QH
Begins a series of four three quarter-hour assignments at an approved athletic training site supervised by certified athletic training personnel. *Prereq.* HSL 1609 and permission of instructor.
- HSL 1791 Athletic Training Practicum 2** 3 QH
Continues HSL 1790. *Prereq.* HSL 1790.
- HSL 1792 Athletic Training Practicum 3** 3 QH
Continues HSL 1791. *Prereq.* HSL 1791.
- HSL 1793 Athletic Training Practicum 4** 3 QH
Continues HSL 1792. *Prereq.* HSL 1792.
- HSL 1800 Supervised Field Experience 1** 6 QH
When combined with another approved field-based course (HSL 1801 or HSL 1803), offers assignment in a field setting related to the student's area of study within the curriculum, including observing and performing professional skills under the guidance of a certified cooperating field professional and college supervisor. Includes supervision, evaluation conferences, and seminars as an integral part of this experience. Taken by HSL majors not in teacher preparation.
- HSL 1801 Supervised Field Experience 2** 6 QH
When combined with another approved field-based course (HSL 1800 or HSL 1802), offers assignment in a field setting related to the student's area of study within the curriculum, including observing and performing professional skills under the guidance of a certified cooperating field professional and college supervisor. Includes supervision, evaluation conferences, and seminars as an integral part of this experience.
- HSL 1802 Supervised Student Teaching 1** 6 QH
Provides a supervised teaching experience in an approved school in which the student assumes clear instructional responsibilities for at least half of the time and full teaching responsibilities for a substantial period of time under the guidance of a certified cooperating teacher and college supervisor. Must be at the level of the teacher certification sought. Includes supervision, evaluation conferences, and seminars as an integral part of this experience. Taken by students who wish to apply for teacher certification. Allows a minimum of 300 clock hours for teacher certification to be achieved when the student successfully completes this course and HSL 1801 or HSL 1803. These courses should be taken in the same quarter.

- HSL 1803 Supervised Student Teaching 2** 6 QH
Provides a supervised teaching experience in an approved school in which the student assumes clear instructional responsibilities for at least half of the time and full teaching responsibilities for a substantial period of time under the guidance of a certified cooperating teacher and college supervisor. Must be at the level of the teacher certification sought. Includes supervision, evaluation conferences, and seminars as an integral part of this experience. Taken by students who wish to apply for teacher certification. Allows a minimum of 300 clock hours for teacher certification to be achieved when the student successfully completes this course and HSL 1801 or HSL 1802. These courses should be taken in the same quarter.
- HSL 1805 Supervised Student Teaching 3** 6 QH
Extends HSL 1802 and HSL 1803 to accommodate students pursuing certification at two levels and who require the additional student teaching practicum of an additional 150 hours. May also be used by student teachers needing extra involvement to meet certification standards not met during HSL 1802 and HSL 1803.
- HSL 1863 TAC — Special Problems** 2 QH
Presents directed study in analysis and coaching of a sport or activity not offered by the department or in special scheduling situations, for example, field hockey, football, lacrosse, wrestling. *Prereq.* Permission of instructor.
- HSL 1866 Special Problems** 4 QH
Presents current issues and concepts in cardiovascular health and exercise for discussion. Requires an independent research paper. *Prereq.* Junior and senior CVHE majors.

Medical Laboratory Science

- MLS 1101 Medical Laboratory Science Orientation 1** 1 QH
Focuses on the history and development of the medical lab science profession; includes an introduction to medical terminology.
- MLS 1102 Medical Laboratory Science Orientation 2** 1 QH
Continues discussion of topics introduced in MLS 1101, with the addition of a review of mathematics and metric-unit calculations.
- MLS 1109 Foundations of Clinical Laboratory Science** 4 QH
Examines basic lab methods employed in primary care, including urinalysis, gram staining, hematocrit, hemoglobin, sedimentation rate, white cell count, and differential. *Prereq.* Admission to physician assistant program or permission of instructor.
- MLS 1112 Renal Physiology and Urinalysis** 2 QH
Introduces basic medical laboratory science. Examines principles and theories of renal physiology. Emphasizes techniques for chemical and microscopic detection of normal and abnormal urinary tract constituents. *Prereq.* BIO 1107 and CHM 1111.
- MLS 1123 Basic Hematology 1** 2 QH
Introduces hematology procedures and principles; hemoglobin, hematocrit, white and red blood cell counts; and white cell differentiation. Replaces lecture portion of MLS 1121. *Prereq.* BIO 1107 and CHM 1122.

MLS 1124 Basic Hematology 2 Studies the principles and procedures of hematology, emphasizing hematologic cell maturation, morphology, and basic hemostasis. Replaces lecture portion of MLS 1122. <i>Prereq. MLS 1123 or MLS 1321.</i>	2 QH	MLS 1412 MLT Special Topics—Applied Microscopy Offers clinical practicum in applied urinalysis, parasitology, and mycology at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. <i>Prereq. Admission to MLT Clinical Program.</i>	2 QH
MLS 1132 Basic Immunohematology Teaches the principles of immunohematology with specific application to the ABO and Rh blood group system, antibody detection, and crossmatch design. Studies basic blood bank techniques including blood typing and crossmatching. Replaces immunohematology lecture portion of MLS 1131. <i>Prereq. BIO 1107, MLS 1171, and MLS 1271.</i>	3 QH	MLS 1423 MLT Applied Study in Hematology Offers clinical practicum in hematology and coagulation at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. <i>Prereq. Admission to MLT Clinical Program.</i>	2 QH
MLS 1142 Basic Clinical Microbiology 1 Introduces the principles and techniques of organism isolation, cultivation, and identification from clinical specimens. Replaces lecture portion of MLS 1141. <i>Prereq. BIO 1107, CHM 1122, MLS 1171, and MLS 1271.</i>	3 QH	MLS 1432 MLT Applied Study in Blood Banking Offers clinical practicum in blood banking at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. <i>Prereq. Admission to MLT Clinical Program.</i>	2 QH
MLS 1144 Basic Microbiology 2 Discusses identifying bacteria that are pathogenic for humans according to the isolated organism's clinical specimen. Emphasizes how to collect and transport specimens, what laboratory protocols to use in diagnosis, and procedures for identifying organisms. <i>Prereq. MLS 1142.</i>	1 QH	MLS 1442 MLT Applied Study in Clinical Microbiology Offers clinical practicum in microbiology at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. <i>Prereq. Admission to MLT Clinical Program.</i>	2 QH
MLS 1152 Basic Clinical Chemistry and Instrumentation Covers the principles of clinical chemistry with application to procedures and techniques. In laboratory work, emphasizes the clinical significance and common methods of quantitating selected important analyses. Replaces lecture portion of MLS 1151. <i>Prereq. CHM 1122, and MLS 1112 or MLS 1311.</i>	4 QH	MLS 1452 MLT Applied Study in Clinical Chemistry Offers clinical practicum in clinical chemistry at an affiliated hospital providing MLT(ASCP)- and CLT(NCA)-level instruction. <i>Prereq. Admission to MLT Clinical Program.</i>	2 QH
MLS 1172 Basic Immunology Covers the basic concepts of medical immunology, including relationships among disease, immune response, and laboratory procedures. Encompasses the concepts of antigen and antibody structure and relationship, and specific and non-specific host response. Covers common laboratory methods for the detection of antigens and antibodies.	2 QH	MLS 1480 MLT Seminar 1 Offers a basic introduction to correlation of laboratory findings in hematology, blood banking, microbiology, and clinical chemistry, with appropriate referrals of lab information in working situation. Examines basic use of quality control. <i>Prereq. Admission to MLT Clinical Program.</i>	2 QH
MLS 1212 Urinalysis Lab Laboratory for MLS 1112.	1 QH	MLS 1523 Hematology MT Applied Study Offers clinical practicum in applied hematology at an affiliated hospital providing for MT(ASCP)- and CLS(NCA)-level instruction. <i>Prereq. Admission to MT Clinical Program.</i>	4 QH
MLS 1223 Basic Hematology 1 Lab Laboratory for MLS 1123.	1 QH	MLS 1533 Immunohematology MT Applied Study Offers clinical practicum in applied immunohematology at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. <i>Prereq. Admission to MT Clinical Program.</i>	4 QH
MLS 1224 Basic Hematology 2 Lab Laboratory for MLS 1124.	1 QH	MLS 1544 Clinical Microbiology MT Applied Study Offers clinical practicum in applied microbiology at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. <i>Prereq. Admission to MT Clinical Program.</i>	7 QH
MLS 1232 Basic Immunohematology Lab Laboratory for MLS 1132.	1 QH	MLS 1552 Clinical Chemistry MT Applied Study Offers clinical practicum in applied clinical chemistry at an affiliated hospital providing MT(ASCP)- and CLS(NCA)-level instruction. <i>Prereq. Admission to MT Clinical Program.</i>	7 QH
MLS 1242 Basic Clinical Microbiology 1 Lab Laboratory for MLS 1142.	1 QH	MLS 1573 Clinical Immunology MT Applied Study 1 Offers clinical practicum in applied clinical immunology at an affiliated hospital providing MT (ASCP)- and CLS (NCA)-level instruction. <i>Prereq. Admission to MT Clinical Program.</i>	1 QH
MLS 1244 Basic Clinical Microbiology 2 Lab Laboratory for MLS 1143.	1 QH	MLS 1574 Clinical Immunology MT Applied Study 2 Continues MLS 1573.	1 QH
MLS 1252 Basic Clinical Chemistry and Instrumentation Lab Laboratory for MLS 1152.	1 QH	MLS 1621 Advanced Hematology 1 Studies physiology of blood cells and bone marrow; reviews physiology of blood hemopoiesis; discusses hematologic results as they	3 QH

relate to normal, anemic, and leukemic conditions. *Prereq.* *MLS 1124* or *permission of instructor*.

MLS 1623 Special Topics: Hemostasis 1 QH
Offers advanced studies in hemostasis, emphasizing identifying factors and solving hemostatic problems. *Prereq.* *MLS 1124* or *permission of instructor*.

MLS 1631 Advanced Immunohematology 2 QH
Examines blood group systems, antibody identification, and advanced immunohematologic principles and procedures. Presents case studies. *Prereq.* *MLS 1332* or *MLS 1132*.

MLS 1648 Advanced Clinical Microbiology 4 QH
Examines host and microbial interactions in disease produced by viruses, rickettsia, chlamydia, mycoplasma, mycobacteria, anaerobic bacteria, and actinomyces. Also covers host and microbial interactions in gastrointestinal, genitourinary, and respiratory tract infections. Discusses disease states, diagnostic procedures, and antimicrobial testing. Combines MLS 1645 and MLS 1646. *Prereq.* *MLS 1142* and *MLS 1143*.

MLS 1654 Advanced Clinical Chemistry 1 4 QH
Includes current methodologies and instrumentation used in clinical chemistry to evaluate hormonal conditions, drug level monitoring, amino acids, proteins, enzymes, and carbohydrates. Combines content included in MLS 1651 and MLS 1652. *Prereq.* *MLS 1152*, *MLS 1351*, or *permission of instructor*.

MLS 1655 Advanced Clinical Chemistry 2 4 QH
Studies metabolism and procedures for nucleic acids, lipids, acid-base balance, hepatic, renal and gastrointestinal systems, as well as vitamin and trace metal blood levels. Combines content included in MLS 1652 and MLS 1653. *Prereq.* *MLS 1654* or *permission of instructor*.

MLS 1661 Medical Laboratory Science Education 2 QH
Surveys current topics in medical lab science education: developing objectives, methods of evaluation and certification, clinical instruction and evaluation, medical lab science curricula, and use of media and other methods of instruction. *Prereq.* *Completion of clinical program*.

MLS 1662 Clinimetrics 2 QH
Covers measuring and improving the quality of all steps in the total testing process. Combines Deming's principles of industrial quality management with traditional practices in clinical laboratory quality assurance programs. Discusses design strategies including ordering tests, selecting methods, monitoring analytic quality, and interpreting and reporting tests. Examines each strategy's effectiveness. *Prereq.* *Completion of MLS clinical applied study*.

MLS 1665 Medical Laboratory Management 2 QH
Surveys factors that relate to effective lab administration: hospital organizational structure, principles of management and supervision, cost accounting, purchasing, inspection guidelines, legal responsibilities, and personnel relations. *Prereq.* *Completion of clinical program*.

MLS 1672 Immunopathology 3 QH
Covers the situations in which the host defense response produces the symptoms of disease. Discusses conditions that result from immunodeficiency. Explains the role of the immune system

in transplant rejection. Describes neoplasms of the immune system and discusses laboratory procedures used in the diagnosis and management of these conditions. *Prereq.* *MLS 1171*.

MLS 1680 MLS Special Topics 2 QH
Discusses current topics in the clinical lab. *Prereq.* *MLS 1111*, *MLS 1121*, *MLS 1122*, *MLS 1131*, *MLS 1141*, and *MLS 1151*.

MLS 1681 MLS Senior Seminar 2 QH
Reviews current undergraduate medical lab science topics.

MLS 1890 Undergraduate Research 2 QH
Examines special problems in lab medicine involving individual research under the direction of a faculty member. *Prereq.* *Permission of instructor*.

MLS 1891 MLS Current Concepts 1 QH
Discusses topics determined by recent advances in medical lab science.

Pharmacy

PAH 1101 Health Career Seminar 1 QH
Provides students with the opportunity to determine their career goals in the health professions through activity-oriented classes and discipline-specific career information. Addresses self-assessment, career exploration, decision making, and goal implementation. Allows students to gather information about the five majors within the Bouvé College of Pharmacy and Health Sciences.

PAH 1135 Professional Dynamics in the Health Care Delivery System 4 QH
Examines the evolution of the American health care delivery system, with emphasis on current aspects of how health care is delivered, how it is financed, where it is delivered, and who delivers it. Discusses present and future influences in health, including health promotion, disease prevention, and environmental issues. Considers unique and collective health professional roles and responsibilities, humanistic/behavioral dimensions of health care, professional organizations, and professionalism.

PAH 1202 Anatomy-Physiology 1 5 QH
Covers structure and function of cells, tissues, and organs, including the muscular, immune, and nervous systems. Includes human skeletal anatomy and cat dissection. Oriented to students in the health professions. Lab fee. *Prereq.* *CHM 1122* or *CHM 1102*, and *BIO 1107*.

PAH 1204 Anatomy-Physiology 2 5 QH
Covers structure and function of the various life-supportive systems not covered in the first quarter: cardiovascular, endocrine, gastro-intestinal, and pulmonary systems. Emphasizes in the lab the basic principles involved in understanding the functioning life systems and cell function. Lab fee. *Prereq.* *PAH 1202* or *permission of instructor*.

PAH 1210 Anatomy-Physiology 1 4 QH
Offers students the opportunity to take the lecture portion only of PAH 1202. *Prereq.* *Permission of instructor*.

PAH 1211 Anatomy-Physiology Laboratory 1 1 QH
Offers students the opportunity to take the lab portion only of PAH 1202. *Prereq.* *Permission of instructor*.

- PAH 1212 Anatomy-Physiology 2** 4 QH
Offers students the opportunity to take the lecture portion only of PAH 1204. *Prereq.* *Permission of instructor.*
- PAH 1213 Anatomy-Physiology Laboratory 2** 1 QH
Offers students the opportunity to take the lab portion only of PAH 1204. *Prereq.* *Permission of instructor.*
- PAH 1280 Biochemistry** 5 QH
Introduces the structures, functions, and metabolism of amino acids, proteins, carbohydrates, lipids, and nucleic acids. Discusses the mechanisms of enzyme reactions, enzyme kinetics, vitamins, biological oxidation reduction reactions, and bioenergetics, as well as various inborn errors of metabolism. *Prereq.* *CHM 1268 and CHM 1269.*
- PAH 1776 Junior/Senior Honors Thesis** 4 QH
Provides students with the opportunity to become involved with faculty on either ongoing research projects or student-initiated scholarly activities. Encourages and assists students in writing, presenting, and publishing their research. Allows students to gain an awareness and some understanding of a discipline or area of study in the allied health professions while developing an appreciation for research methods and the process of scientific inquiry. Requires a junior/senior thesis. *Prereq.* *Honors participation.*
- PAH 1777 Honors Adjunct** 1 QH
Designed to be attached to a predesignated professional course in the student's major and offered at the discretion of the faculty member(s) teaching the course. For further details, contact the honors office (215LA) or PAH honors advisor. *Prereq.* *Honors participation and permission of instructor.*
- PCL 1101 Drugs—Their Uses and Actions** 4 QH
Studies background, classification, dose responses, untoward side effects, uses, and commercial preparations of a broad series of drugs. *Not open to pharmacy, respiratory therapy, or nursing majors.*
- PCL 1301 Basic Pharmacology** 3 QH
Provides students an opportunity to learn the classification, mechanisms of action, and uses of a broad spectrum of therapeutic agents. Emphasizes dose response and untoward side effects. *Prereq.* *Physician assistant majors or permission of instructor.*
- PCL 1305 Pharmacodynamics** 3 QH
Introduces pharmacologic principles, with the pharmacotherapeutics of drug groups and individual drug substances of particular importance in treatment and diagnosis of disease. *Prereq.* *BIO 1120, BIO 1255, CHM 1111, and CHM 1112.*
- PCL 1309 Pharmacology for the Respiratory-Care Practitioner** 4 QH
Provides an orientation to pharmacology, including the scope of pharmacology; definitions; drug standards; drug legislation; names, sources, and active constituents; and pharmaceutical preparations of drugs relating to the respiratory-care practitioner.
- PCL 1420 Pharmacology/Medicinal Chemistry 2** 6 QH
Continues discussion of topics introduced in PMC 1419. Presents an interdisciplinary chemical and pharmacological approach to understanding drug action. Deals principally with drugs affecting the peripheral nervous, cardiovascular, and renal systems. *Prereq.* *PMC 1419 and middler standing.*
- PCL 1422 Pharmacology/Medicinal Chemistry 3** 6 QH
Continues discussion of topics in PCL 1420. Covers the medicinal chemistry and pharmacology of drugs acting on the gastrointestinal, endocrine, reproductive, and hematopoietic systems, along with autocoid and antineoplastics. *Prereq.* *PCL 1420 and junior standing.*
- PCL 1451 Pharmacology Laboratory** 1 QH
Provides experience in systematically monitoring the qualitative effects of selected drugs from major classes of drugs by a modified "Hippocratic Screen" technique. Studies basic quantitative characteristics of drug dose-response relationships, factors influencing such relationships, and general methods of calculating and reporting such data. Lab fee. *Prereq.* *PMC 1418 and middler standing.*
- PCL 1801, PCL 1802, PCL 1803** 4 QH each
Special Research Project (Pharmacology)
Provides opportunity for directed study or research in pharmacology/toxicology wherein the student may undertake in-depth investigation of an area of specialized interest. Lab fee. *Prereq.* *Permission of instructor and program director.*
- PCT 1240 Pharmaceutical Calculations** 4 QH
Introduces the application of mathematical concepts in pharmacy. Emphasizes systems of measurement and basic arithmetic calculations as they relate to the practice of pharmacy. Also introduces statistical analysis methods required for subsequent courses in pharmaceutics and for improving problem-solving skills using computers. *Prereq.* *CHM 1122.*
- PCT 1310 Pharmaceutics Laboratory 1** 1 QH
Focuses on the physicochemical principles of pharmaceutical preparations and their relationship to quality control and biopharmaceutics and pharmacokinetics. *Prereq.* *PCT 1340 or concurrent enrollment.*
- PCT 1320 Pharmaceutics Laboratory 2** 2 QH
Focuses on the application of the fundamental principles and techniques of pharmaceutics to the lab preparation and use of various pharmaceutical products. *Prereq.* *PCT 1350 or concurrent enrollment.*
- PCT 1350 Pharmaceutics 2** 5 QH
Focuses on the application of the fundamental principles of physical pharmacy to the formulation of pharmaceutical preparations. Emphasizes pharmaceutical dosage forms, including both industrial formulation and extemporaneous compounding. *Prereq.* *PCT 1340 and middler standing.*
- PCT 1440 Biopharmaceutics/Pharmacokinetics** 4 QH
Acquaints students with biopharmaceutics and basic pharmacokinetics. Discusses dissolution, disintegration, general concept of one- and two-compartment models; linear and nonlinear pharmacokinetics; drug kinetics after intravenous, intramuscular, or oral administration; practical methods of one-compartment model utilizing urinary data; bioavailability; multiple-dosing kinetics; and general approaches to dosage adjustment in disease states. *Prereq.* *PAH 1204, PCT 1340, and junior standing.*
- PCT 1801, PCT 1802, PCT 1803** 4 QH each
Pharmaceutics Special Research Project
Provides opportunity for directed study or research in one of the pharmaceutical sciences, wherein the student may undertake

in-depth investigation of an area of specialized interest. Lab fee.
Prereq. Permission of instructor(s) and program director.

PHP 1301 Pharmaceutical Jurisprudence 4 QH
 Offers a comprehensive analysis and interpretation of laws relating to the practice of pharmacy. Discusses federal and state food and drug laws, narcotics laws, Medicare and Medicaid regulations, and state pharmacy laws. *Prereq.* Junior standing.

PHP 1302 Pharmacy Administration I 4 QH
 Covers socioeconomic aspects of pharmacy: the government's relation to the pharmaceutical industry, trends in contemporary practice, third-party payment plans, macroeconomic impact on the industry, and the interaction of current concepts in pharmacy. *Prereq.* Senior standing or permission of instructor.

PHP 1303 Interpersonal Skills for Health Professionals 4 QH
 Applies the skills of interpersonal communication to situations encountered in various health care settings. Provides students with an opportunity to learn to integrate specific technical competence with serious concern for personal, social, and cultural factors in illness and health care. Through the use of medical sociology literature, audio-visual materials, case analyses, and personal reflection on actual patient encounters, provides the students with an opportunity to improve interpersonal communication skills and to increase their understanding of practitioner patient relationships, patient's needs and responses in illness and treatment, and professional behavior in practice settings.

PHP 1304 Social Pharmacology 4 QH
 Studies drug-taking experiences and behaviors. Provides an overview of theories and research findings that describe the relationships between personal, social, and cultural factors and drug taking, while comparing and contrasting the social approach with the pharmacological paradigm of drug effects and the medical model of drug use. Through readings, audiovisual materials, and descriptions of personal experiences, examines the varieties of drug experiences, patterns of and reasons for drug taking of all types, and strategies for preventing drug-use problems.

PHP 1305 Hospital Pharmacy Management 4 QH
 Examines the factors involved in the operations and management of a hospital pharmacy within the context of the total hospital structure. *Prereq.* Senior standing or permission of instructor.

PHP 1306 Community Pharmacy Management 4 QH
 Focuses on the management requirements for establishing a community pharmacy. Analyzes the prevailing types of organizations, locations, leases, business organization, staffing, plant layout and design, and financial factors. *Prereq.* Senior standing or permission of instructor.

PHP 1308 Financial Management 4 QH
 Examines the fundamentals of accounting and finance, with emphasis on their application to retailing and community pharmacy management. Covers accounting systems, analysis of financial statements, budgets, cash flow, taxation, and finance in depth. *Prereq.* Permission of instructor.

PHP 1401 Drug Information and Evaluation 3 QH
 Introduces the principles and practice of drug information. Covers the levels of practice, the availability of therapeutic reference sources, the use of abstracting and indexing systems,

how to respond to drug information questions, and basic statistical data required to help understand the medical and pharmaceutical literature. *Prereq.* Fourth-year standing or permission of instructor.

PHP 1402 Parapharmaceuticals 2 QH
 Focuses on the nature and application of various surgical devices, appliances, bandages, home health care products, and hospital and sickroom supplies in patient care. Also, introduces sterile products. *Prereq.* Senior standing.

PHP 1411 Pathophysiology 4 QH
 Focuses on basic concepts of pathophysiology for pharmacy, toxicology, and respiratory therapy majors, emphasizing disease processes and alterations of normal organ functions. *Prereq.* PAH 1202, PAH 1204, and middler standing.

PHP 1441 Therapeutic Drug Monitoring 4 QH
 Covers the monitoring, developing, and modifying of drug dosage regimens and the pharmacokinetic factors influencing the regimen selection for various therapeutic drug categories. *Prereq.* PCT 1440 and junior standing.

PHP 1501 Pharmacy Externship 4 QH
 Involves a 520-hour (13 weeks x 40 hours/week) structured practicum in community pharmacy. Includes applied aspects of community pharmacy management; medication dispensing; and patient-oriented services such as prescription and nonprescription medication, consultation, and patient-profile monitoring. *Prereq.* Fifth-year standing.

PHP 1503 Professional Practice Laboratory 1 QH
 Focuses on compounding and dispensing medications in both institutional and ambulatory pharmacy settings. Emphasizes patient counseling techniques and monitoring appropriateness of therapy. *Prereq.* Fifth-year standing.

PHP 1506 Clinical Pharmacy Clerkship 8 QH
 Involves assignment to a clinical site for five full days per week to observe patient response to medication and to evaluate and advise on all factors that may modify efficacy, safety, and economy of therapy. Offers campus seminar with student presentations on current therapeutic topics. *Prereq.* PHP 1601 and senior standing.

PHP 1601 Nonprescription Medication 4 QH
 Provides an overview of the types of over-the-counter medications. Discusses the directions and precautions for proper use of these preparations. *Prereq.* Junior standing.

PHP 1603 Selected Topics in Clinical Pharmacy I 4 QH
 Helps students increase their understanding of selected diseases. Examines pathophysiology and diagnosis of the illness as well as drug therapy and its relation to patient compliance and education. Provides greater depth than existing clinical pharmacy courses. *Prereq.* PHP 1602 and permission of instructor.

PHP 1604 Selected Topics in Clinical Pharmacy 2 4 QH
 Helps increase the student's knowledge of selected disease entities. Examines pathophysiology and diagnosis of the illness as well as drug therapy and its relation to patient compliance and education. Provides greater depth than existing clinical pharmacy courses. *Prereq.* PHP 1602 and permission of instructor.

PHP 1605 Introduction to Sterile Products**4 QH**

Introduces pharmacists' role in manufacturing and using sterile products. Covers intravenous incompatibilities, aseptic technique, sterile room equipment, quality control, safe handling of cancer chemotherapeutic agents, and sterile product room systems and design. Discusses a variety of sterile products, including parenteral nutrition, small and large volume parenterals, irrigating solutions, cancer chemotherapeutic agents, and ophthalmic preparations. Emphasizes developing an ability to interact with other health professionals. Offers experience using laboratory equipment to prepare sterile products. *Prereq.* Fourth- or fifth-year pharmacy majors only.

PHP 1607 Cancer Chemotherapeutics**4 QH**

Emphasizes the role of chemotherapy in the management of malignant disease. Discusses clinical applications of specific chemotherapeutic agents, with the remainder of the course concentrating on specific disease states. Covers related topics such as pain control in cancer patients, control of nausea and vomiting, principles of cancer research, cancer quackery, and adverse effects of chemotherapy. *Prereq.* Fourth-year pharmacy major or permission of instructor.

PHP 1609 Pharmacotherapeutics**6 QH**

Examines the drug treatment of the major pharmacologically managed disease states. Covers selected cardiovascular, respiratory, hepatic, renal, joint, endocrine, psychiatric, and oncologic disorders. *Prereq.* PCL 1420, PCL 1422, PCT 1440, PMC 1419, PMC 1421, and junior standing.

PHP 1612 Special Topics in Pharmacy Administration**2 QH**

Discusses in-depth a selected topic in the area of pharmacy administration. Topics include business, professional, and environmental management/administrative aspects of pharmacy practice in all settings. *Prereq.* Junior or senior pharmacy majors only.

PHP 1614 Special Topics in Pharmacy Administration**4 QH**

Discusses in-depth a selected topic in pharmacy administration. Topics include business, professional, and environmental management/administrative aspects of pharmacy practice in all settings. *Prereq.* Junior or senior pharmacy majors only.

PHP 1801, PHP 1802, PHP 1803, PHP 1804**4 QH each****Special Research Project**

Provides opportunity for directed study or research in clinical pharmacy or pharmacy administration, wherein the student may undertake in-depth investigation of an area of specialized interest. *Prereq.* Permission of instructor.

PHP 1805 Special Research Project**3 QH**

Offers directed study or research in pharmacy administration, allowing for the in-depth investigation of an area of special interest. *Prereq.* Permission of instructor.

PHP 1806 Special Research Project**2 QH**

Same as PHP 1805.

PMC 1419 Medicinal Chemistry/Pharmacology 1**5 QH**

Introduces the principles of pharmacology and medicinal chemistry. Discusses the major drug classes affecting the central nervous system, including anxiolytics, sedative-hypnotics, anes-

thetics, anticonvulsants, neuroleptics, antidepressants, and narcotic analgesics. Considers therapeutic indications, mechanisms of action, structure-activity relations, and undesirable actions including drug abuse. *Prereq.* BIO 1107, CHM 1269, PAH 1202, PAH 1204, and middler standing.

PMC 1421 Antiinfectives**5 QH**

Presents an integrated approach to the study of antiinfective agents. Emphasizes the biochemical basis for the action mechanism of antibacterial, antifungal, and antiviral agents; the chemistry of representative members of the major classes of antiinfective agents; and the pharmacology, pharmacokinetics, and therapeutic applications of drugs used to treat bacterial, fungal, and viral infections. Discusses the AIDS epidemic with a focus on investigating new drugs and treatment modalities that may be valuable in either preventing HIV replication or in the therapy of opportunistic infections. *Prereq.* BIO 1121, PAH 1280, PMC 1419, and junior standing.

PMC 1801, PMC 1802, PMC 1803**4 QH each****Special Research Project (Medicinal Chemistry)**

Offers directed study or research in one of the medicinal chemistry areas, wherein students may undertake in-depth investigation of an area of specialized interest. Lab fee. *Prereq.* Permission of instructor and program director.

Physical Therapy

PTH 1007 Cooperative Education in Physical Therapy**1 QH**

Introduces students to cooperative education and its implications for career planning in physical therapy.

PTH 1114 Introduction to Physical Therapy 1**2 QH**

Provides orientation to the field of physical therapy and its role in the health professions. Explores theory and practice in applied body mechanics and basic procedures related to patient management.

PTH 1115 Introduction to Physical Therapy 2**2 QH**

Provides practice in the preparation of patients and equipment for various treatment procedures. Focuses on theory demonstration and practice in heat, light, and hydrotherapy.

PTH 1118 Development Base of Human Performance**4 QH**

Studies the growth and development of perceptual-motor skills from birth to old age. Considers age expectations for perceptual-motor behavior, focusing on the processes underlying developmental changes.

PTH 1202 Therapeutic Modalities in Physical Therapy Practice**3 QH**

Provides practice in preparing patients and equipment for various treatment procedures using physical agents. Includes theory, demonstration, and practice in applying heat and cold modalities, hydrotherapy, ultraviolet and laser light therapies, and electrotherapy. *Prereq.* PTH 1114.

PTH 1310 Clinical Gross Anatomy**6 QH**

Regionally covers the structure and function of the human body, with particular emphasis on the skeletal, muscular, nervous, and vascular components of each region. Involves lectures, cadaver

prosection, osteology labs, and surface anatomy palpation to investigate basic human anatomy and the clinical applications of anatomy lab. *Prereq.* BIO 1254 and BIO 1255.

PTH 1315 Physiology for Physical Therapists 5 QH

Covers neuromuscular, cardiovascular, and respiratory physiology applied to physical therapy. *Prereq.* BIO 1254, BIO 1255, and PTH 1115.

PTH 1316 Neuromuscular Physiology 4 QH

An in-depth study of neuromuscular physiology, motor control, and motor learning, with applications to physical therapy practice.

PTH 1320 Soft Tissue Mobilization 2 QH

Offers theory, demonstrations, and practice of manual therapy integrated with other treatment procedures. Also covers anatomical and physiological theory and principles. Uses problem solving and case analyses. *Prereq.* BIO 1254, BIO 1255, and PTH 1115.

PTH 1325 Clinical Medicine 1 4 QH

Covers general medicine, lab medicine, and pathology as related to conditions commonly treated by physical therapists. *Prereq.* BIO 1254 and BIO 1255.

PTH 1330 Clinical Kinesiology 5 QH

Studies normal movement through analysis of muscle and joint function. Also gives clinical applications for pathological movement. Includes lab. *Prereq.* PTH 1310 and PTH 1315.

PTH 1335 Musculoskeletal Evaluation 3 QH

Covers evaluation procedures, including theory, demonstration, practice, and planning. *Prereq.* PTH 1310, PTH 1315, and PTH 1320.

PTH 1340 Physical Therapy 3 4 QH

Covers basic therapeutic exercise, including theory, demonstration practice, and planning. *Prereq.* PTH 1114, PTH 1115, PTH 1310, PTH 1315, and PTH 1320.

PTH 1341 Musculoskeletal Therapeutic Exercise 5 QH

Explores the theory, planning, and practice of basic therapeutic exercise. Discusses musculoskeletal as well as basic cardiovascular principles. Offers the opportunity to apply principles from other professional courses to design treatment programs using a systematic, problem-solving approach. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1345 Clinical Medicine 2 3 QH

Focuses on orthopedic conditions and their medical, surgical, and physical therapy treatment. *Prereq.* PTH 1310, PTH 1315, and PTH 1325.

PTH 1352 Psychosocial Aspects of Illness 3 QH

Examines interpersonal relationships among patients, families, health professionals, and society, with reference to the impact of and reaction to illness. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1355 Physical Therapy 4 3 QH

Covers theory, demonstration, and practice in prosthetics, orthotics, and advanced functional training of spinal cord-injured patients. *Prereq.* PTH 1315, PTH 1330, PTH 1335, PTH 1340, and PTH 1345.

PTH 1356 Prosthetics 1 QH

Studies theory, demonstration, and current practice in prosthetics. *Prereq.* PTH 1315, PTH 1330, PTH 1335, PTH 1341, and PTH 1345.

PTH 1360 Neurological Therapeutic Exercise 4 QH

Presents theoretical basis and clinical application of integrated approaches to treatment of neurologically impaired clients. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1361 Neurological Assessment and Adult Neurology 3 QH

Focuses on assessing problems of and setting goals for adults with neurological deficits. Covers the etiology, pathology, clinical signs, and medical management of neurological disorders.

PTH 1366 Neuroanatomy 5 QH

Examines morphology and function of the human nervous system. Covers abnormalities of structure and function of the nervous system. Includes lecture and lab. *Prereq.* PTH 1340.

PTH 1370 Clinical Seminar 2 QH

Discusses selected topics related to clinical aspects in physical therapy. Considers interpersonal relationships, ethics, teaching-learning process, communication, group dynamics, medical-legal issues, sociocultural/socioeconomic considerations, and clinical education information. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1375 Physical Therapy 7 2 QH

Covers theory, demonstration, and practice in electrical testing and treatment procedures. *Prereq.* PTH 1335, PTH 1345, and PTH 1366.

PTH 1380 Supervised Clinical Education 1 5 QH

Introduces clinical experience that provides the student with opportunities to practice various skills in the evaluation and treatment of patients under supervision. Requires five weeks during Quarter 9 of the junior year in Massachusetts. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1385 Clinical Medicine 3 3 QH

Focuses on the pediatric and neurologic aspects of physical therapy practice, including review of symptoms, conditions, and therapeutic intervention. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1386 Pediatric Neurology 2 QH

Focuses on the pediatric and neurologic aspects of physical therapy practice. Reviews symptoms, conditions, and therapeutic/medical intervention. *Prereq.* Satisfactory attainment in all prior professional courses.

PTH 1390 Physical Therapy 6 3 QH

Covers respiratory physical therapy, including theory, demonstration, and practice in the management of medical and surgical chest conditions. Introduces respiratory mechanical equipment and cardiopulmonary resuscitation. *Prereq.* PTH 1315, PTH 1330, PTH 1335, and PTH 1340.

PTH 1391 Cardiopulmonary Rehabilitation in Physical Therapy 4 QH

Discusses the role of physical therapy in cardiac and pulmonary rehabilitation. Examines cardio-pulmonary evaluation techniques, etiology, and pathology of common cardiopulmonary disorders and physical therapy management. *Prereq.* Physical therapy students who have satisfactorily completed all prior professional

courses, or respiratory therapy and cardiovascular specialist majors by permission of academic adviser.

PTH 1392 Pathophysiology and Clinical Therapeutics 1 QH
Covers selected topics in pathophysiology and clinical therapeutics related to current practice in physical therapy. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1395 Physical Therapy 5 1 QH
Continues PTH 1360. Covers neurodevelopmental treatment, neurophysiological theory, and clinical application of facilitation and inhibition techniques to enhance motor control. *Prereq. PTH 1330, PTH 1335, PTH 1340, PTH 1345, PTH 1360, and PTH 1366.*

PTH 1396 Pediatric Evaluation/Treatment 2 QH
Explores evaluating and treating the motor aspects of the neuro-muscularly impaired child. Focuses on analyzing normal movement patterns, recognizing movement dysfunction, and treating movement dysfunction. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1400 Administration 4 QH
Explores concepts in administration and management applied to physical therapy. Involves seminar and discussion groups. *Prereq. PTH 1380.*

PTH 1405 Research for Physical Therapy 4 QH
Covers introduction to research design, basic statistics, analysis of scientific and medical literature, and preparation of an independent research proposal. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1411 Clinical Integration 4 QH
Incorporates analysis and comparison of methods of physical therapy evaluation and treatment, with an emphasis on therapeutic exercise. Focuses on treatment planning for various problems, with emphasis on rationale and selection of treatment alternatives. Uses case study format and case simulations. Meets for three lecture hours, with the third hour in seminar format with small-group discussions. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1415 Supervised Clinical Education 2 0 QH
Provides advanced clinical education by giving the student further opportunities to practice various phases of physical therapy under supervision in preparation for assuming the role of a qualified physical therapist. Involves assignments in Massachusetts and other states, and twelve weeks during senior year. Required for graduation from the physical therapy program. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1420 Physical Therapy in the Health Care System 3 QH
Examines major issues affecting the delivery of health care. Emphasizes the role of the physical therapist as a member of the health team. Involves class discussion and seminar. *Prereq. PTH 1370 and PTH 1380.*

PTH 1426 Aspects of Aging 3 QH
Discusses the interaction of psychological, social and physiological factors and their effects on the potential for function of the elderly client. Studies and designs assessment instruments. *Prereq. PTH 1370 and PTH 1380.*

PTH 1450 Investigative Studies 6 QH
Covers selected modules related to current practice in physical therapy; completion of research project on a volitional basis. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1453 Advanced Musculoskeletal Assessment and Treatment 3 QH
Provides an opportunity to develop knowledge and skills in evaluating and treating joint dysfunction. Uses a problem-solving approach. *Prereq. Satisfactory attainment in all prior professional courses.*

PTH 1602 Special Topics in Physical Therapy 2 QH
Offers innovative methods of instruction and deals with areas of special interest.

PTH 1604 Special Topics in Physical Therapy 4 QH
Offers innovative methods of instruction and deals with areas of special interest.

PTH 1777 Honors Adjunct 1 QH
Constitutes an addition to any three, four-, five-, or six-quarter-hour course in the department when approved by the honors committee of the college. Once approved, the adjunct information is forwarded to the honors membership by the honors office. Allows students to enroll an unlimited number of times as an adjunct to any physical therapy course.

PTH 1800 Directed Study 2 QH
Provides experience for the student whose unique academic needs or interests cannot be adequately satisfied in the basic, entry-level curriculum of the Department of Physical Therapy. *Prereq. Permission of instructor, chair, and dean.*

Speech-Language Pathology and Audiology

SLA 1101 Introduction to Speech and Hearing 4 QH
Offers an overview of disorders of speech and hearing and their treatment, and a review of normal speech and hearing development. Requires clinical observations of persons with speech, language, and hearing disorders.

SLA 1200 Speech and Hearing Science 4 QH
Presents concepts and information related to the physics of sound and principles of psychophysics and audition. Introduces the anatomical and physiological basis of speech sound production and the acoustic analysis of speech. Examines current theories and research in speech reception, perception, and production.

SLA 1201 Anatomy and Physiology of Vocal Mechanisms 4 QH
Offers an in-depth study of the static structure, musculature, and physiology of the speech mechanism. Emphasizes current research in speech physiology. *Prereq. SLA 1101.*

SLA 1300 Language Acquisition 4 QH
Analyzes the emerging semantic and syntactical aspects of language in normal and atypical children. Discusses current theory and research in language acquisition. Requires clinical observations of children with normal and atypical language patterns. *Prereq. SLA 1101.*

SLA 1301 Phonetics and Developmental Phonology**4 QH**

Offers basic training in auditory recognition and symbolization of phonemes and allophones in major American dialects. Stresses static and dynamic articulatory descriptions. Also includes a review of the developmental sequence of phonemic acquisition.

Prereq. SLA 1101 and SLA 1201.

SLA 1303 Introduction to Audiology**4 QH**

Focuses on the basic techniques of audiometric testing and hearing conservation, including a review of basic hearing sciences and a practicum and laboratory experience in hearing testing.

SLA 1403 Clinical Procedures in Speech and Language**4 QH**

Reviews principles and procedures of the functional analysis of behavior. Focuses on applying behavioral theory and research to speech, language, and hearing training. Emphasizes clinical investigation in the experimental analysis of behavior, and offers experience applying experimental procedures in assessing and treating people with communication disorders.

SLA 1460 Neurological Bases of Communication**4 QH**

Provides an opportunity to acquire an understanding of neuroanatomy and neurophysiology as they relate to normal aspects of speech, hearing, and language.

SLA 1800 Directed Study**4 QH**

Provides study for the student whose unique academic needs or interests cannot adequately be satisfied in any of the scheduled courses of the department. Requires approval of the supervising faculty member, the chair, and the dean. Also requires that approval forms be submitted to the dean's office during the quarter prior to registration for the directed study. *Prereq.*

Permission of instructor.

TOX 1302 Chemical and Analytical Toxicology**4 QH**

Continues TOX 1301. Places additional emphasis on the interpretation of the toxicological literature to evaluate the risk involved from exposure to prototype chemicals. Uses structure activity and biochemical methods of assessment to evaluate the toxicity of major classes of chemical compounds. *Prereq. PMC 1418 and TOX 1301.*

TOX 1322 Biochemical Toxicology Laboratory**4 QH**

Introduces the student to investigational methods for assessing toxicity; helps develop the student's ability to analyze and interpret data generated in the lab and in the literature; and helps the student develop technical writing skills. Uses rodents as a model for toxic insult. Examines hepatotoxicity, neurotoxicity, teratogenicity, and other toxic manifestations at the whole-animal, whole-tissue, and biochemical levels. *Prereq. TOX 1300, TOX 1301, or TOX 1302.*

TOX 1801, TOX 1802, TOX 1803 Special Topics**4 QH each**

Selected areas of toxicology will be explored. These may include research, seminars, comparative analysis of data, or faculty-guided programs.

Toxicology

TOX 1100 Toxicology Orientation**1QH**

Introduces toxicology as it relates to regulatory, environmental, forensic, and clinical issues. Focuses on general principles of toxicology and their application to determining the hazards of toxicants in the workplace, the home, and the environment.

TOX 1101 Current Topics in Toxicology**1 QH**

Discusses topics of interest to toxicology, pharmacy, biology, chemistry, nursing, and related majors. Selects topics from current research that span regulatory, public health, and environmental issues. Explores other toxicology-related topics.

TOX 1300 Clinical Toxicology**4 QH**

Examines the potential toxicity of drugs, commercial products, and environmental agents. Focuses on clinical manifestations, mechanisms of toxicity, principles of treatment, and prevention of acute and chronic poisonings. *Prereq. PMC 1418.*

TOX 1301 Fundamental Principles of Systemic Toxicology**4 QH**

Presents the principles of toxicology from an organ-system perspective. Focuses on the basic concepts used to evaluate toxicity, the mode of injury at the organ and cellular levels, and the basic subcellular mechanisms through which toxic agents produce damaging effects. Uses recent toxicological literature to introduce the concepts needed to evaluate toxicity through the analysis of data. *Prereq. PMC 1418.*

ROTC, Military Officers' Training Program

AIR 1110 Air Force Today 1	1 QH	Discusses organizational and personal values, management of forces in change, organizational power, politics, and managerial strategy and tactics in the context of the military organization. Uses actual Air Force cases to enhance the learning and communication processes.
Examines the role of the United States Air Force in the contemporary world. Surveys background, mission, and organization of the Air Force and functions of United States strategic forces. Also emphasizes development of written communicative skills.		
AIR 1111 Leadership Laboratory 1	1 QH	AIR 1321 Leadership Laboratory 8 1 QH
Introduces the customs, traditions, and courtesies of the Air Force through guest speakers, seminars, and a field trip to an Air Force base.		Continues AIR 1311. Emphasizes supervisory and leadership skills. Discusses advantages of an Air Force career.
AIR 1120 Air Force Today 2	1 QH	AIR 1410 United States National Security Forces 1 4 QH
Continues study of the contemporary Air Force by examining general-purpose forces, aerospace support forces, and the total force structure.		Studies the role of the military in maintaining the security of the United States. Examines the international environment, the background of defense policy, strategy, and forms of conflict. Addresses specific issues, including weapons acquisition, arms control, nuclear deterrence, and the national military decision-making process.
AIR 1121 Leadership Laboratory 2	1 QH	AIR 1411 Leadership Laboratory 5 1 QH
Continues AIR 1111, with emphasis on the role and responsibilities of an Air Force company grade officer.		Focuses on exercise of management functions in planning, supervising, and directing cadet group activities. Provides opportunity to acquire proficiency in military leadership skills.
AIR 1210 Development of Air Power	1 QH	AIR 1420 United States National Security Forces 2 4 QH
Traces the historical development of air power and its uses starting before the Wright Brothers and extending through the Korean War. Concentrates on the advent of the air age, the airplane at war (1914-1918), the interwar years, air power in World War II, the Berlin Airlift, air power in the Korean War, and the evolution of air power concepts and doctrine. Emphasizes student participation and presentations to enhance communicative skills.		Studies the military's role as an institution in a democratic society. Includes such topics as civil-military interaction and the military as a profession. Emphasizes developing communicative skills through student presentation.
AIR 1211 Leadership Laboratory 3	1 QH	AIR 1421 Leadership Laboratory 6 1 QH
Emphasizes development of techniques used to direct and inform. Assigns students to leadership and management positions in the AIR 1111 programs previously described.		Continues AIR 1411. Gives students the opportunity to prepare themselves for professional duties.
AIR 1220 Development of Air Power	1 QH	ARM 1100 Leadership Laboratory 1 0 QH
Traces the historical development of air power and its uses starting after the Korean War and continuing through its present role in international policies. Students also begin five hours of introductory leadership. Continues emphasis upon student participation and presentations to enhance communicative skills.		Introduces first-year ROTC students to the basic tenets of discipline and regimentation of the United States Army. Includes the basics of proper wear of military clothing, proper rendering of military courtesies, military customs and traditions, individual and group drill and ceremonies, manual of arms for the M16A1 rifle, and physical fitness training.
AIR 1221 Leadership Laboratory 4	1 QH	ARM 1101 Introduction to the Army 1.5 QH
Continues AIR 1211. Adds a special program in preparation for field training.		Introduces the student to the U.S. Army. Subjects include customs and courtesies of the Army, Army traditions, rank structure and chain of command, wear and appearance of the uniform, branches of the Army, and the role of military power in the world today. Also introduces the Army writing style and physical fitness training.
AIR 1310 Management and Leadership 1	4 QH	ARM 1102 Leadership vs. Management Styles 1.5 QH
Examines management and leadership from the point of view of the Air Force junior officer. Covers the individual motivational and behavioral processes, leadership, communication, and group dynamics to provide a foundation for the development of the junior officer's professional skills as an Air Force officer.		Teaches leadership and management concepts. Illustrates particular management skills: problem analysis and decision-making, planning and organizing, delegation and control, and interpersonal skills. Uses realistic management simulations and structured exercises to teach essential leadership skills.
AIR 1311 Leadership Laboratory 7	1 QH	ARM 1103 Basic Tactics 1.5 QH
Provides supervisory practice and exercise of leadership functions in controlling and directing activities of the cadet group. Develops leadership potential in a practical, supervised training lab.		Examines the mission, organization, and composition of the basic infantry rifle squad and platoon. Includes basic combat formations, movement techniques, unit capabilities, and planning considerations.
AIR 1320 Management and Leadership 2	4 QH	
Continues AIR 1310 with special emphasis on the basic managerial processes involving decision making, use of analytical aid in planning, organizing, and controlling in a changing environment.		

ARM 1200 Leadership Laboratory 2**0 QH**

Presents introduction and hands-on training for second-year ROTC cadets. Includes required basic military skills, including nuclear, biological, and chemical protective training; selected weapons training; use of United States Army communications equipment; land navigation; orienteering, rappelling; and limited military vehicle maintenance training.

ARM 1201 Basic Rifle Marksmanship**1 QH**

Provides instruction and practical application in basic rifle marksmanship techniques, safety, and range operations.

ARM 1202 Comparative Armies**1.5 QH**

Presents an introduction to the roles and organization of the United States Army's Active, Reserve, and National Guard. Uses these concepts as building blocks to examine and compare armies currently affecting United States doctrine and tactics. Integrates the Soviet, Warsaw Pact, NATO, and other world forces into the course structure through the study and examination of current events inside and outside the military establishment.

ARM 1203 Health and Physical Fitness**1.5 QH**

Presents information for the basic Army ROTC cadet on the components and principles of health, exercise, and physical fitness. Addresses basic health issues, emphasizing proper nutrition, weight control, and stress management. Introduces the student to exercise physiology including flexibility and stretching, cardiorespiratory fitness, and resistance and Nautilus equipment. Reviews methods to improve the cadet's individual score on the Army's physical fitness test.

ARM 1300 Leadership Laboratory**0 QH**

Provides advanced leadership applications for the middler-year Army ROTC cadets. Includes the review and hands-on training of all basic military skills learned in the ROTC basic program of instruction. Gives middler cadets increased leadership responsibility within the cadet battalion for further development and evaluation as well as preparation for their junior year Camp All American platoon training.

ARM 1301 Land Navigation**2 QH**

Presents advanced land navigation techniques to junior-year ROTC cadets. Introduces the topographic map and its commonly used symbols. Identifies common terrain features. Topics include measuring directional azimuths as well as straight line and road distance on a map; and converting azimuths, locating unknown points using the intersection, resection, and modified resection techniques. Requires the student to navigate using a map and compass.

ARM 1302 Advanced Tactics and Training**2 QH**

Introduces the fundamentals of offensive and defensive combat at the squad and platoon levels. Includes unit organizations and capabilities, tactical planning, combat orders. Utilizes practical exercises placing the student in leadership roles in simulated tactical environments. Additionally, examines the proper method to conduct briefings, provide training input, and prepare, conduct, and evaluate training. *Prereq. Basic course completion.*

ARM 1303 Advanced Leadership Clinic**2 QH**

Provides classroom, programmed instruction, and practical exercises (for example, land navigation, physical conditioning, weapons familiarization, and leadership) designed to prepare

cadets for maximum individual performance at the six-week ROTC advanced camp. Required for all cadets attending advanced summer camp at Fort Bragg, North Carolina. *Prereq. Basic course completion.*

ARM 1305 Advanced Leadership Laboratory 5**6 QH**

Provides external leadership lab conducted at Fort Bragg, North Carolina, during the summer quarter. As an intensive six-week course, includes application of leadership principles in positions at varying levels of responsibility. Also includes supplemental instruction such as physical conditioning, counseling, senior-subordinate relations, tactical doctrine, international laws of land warfare, and approaches to problem solving. Course attended by students from 123 colleges and universities from Maine to Florida. All expenses borne by the United States government, including a stipend of approximately five hundred dollars.

ARM 1400 Leadership Laboratory 4**0 QH**

Gives fourth-year ROTC cadets practical application of previously learned skills, techniques, education, and experience by assisting ROTC cadre in the conduct of ARM 1100, ARM 1200, and ARM 1300. Gives cadets an opportunity to prepare and present instruction, manage constrained resources, and supervise subordinates. Evaluates cadets based on active-duty Army criteria. Requires attendance by all fourth-year ROTC cadets enrolled in an ROTC course.

ARM 1401 Organization and Communications Skills**2 QH**

Examines the theory, methods, and principles for understanding and motivating human behavior in organizations. Emphasizes the principles and dynamics of leadership. Directs those principles toward the development of leadership styles. Introduces the officer and noncommissioned officer evaluation system. Makes practical applications through the use of case studies and group processes. *Prereq. Basic course completion.*

ARM 1402 Military Law and Ethics**2 QH**

Examines the issues and responsibilities imposed by law on commanders and staff officers in two broad areas: the military criminal justice system and military administrative law. Presents in-depth analysis of the responsibilities and duties of officers and noncommissioned officers operating in the military justice system. Focuses on the legal basis for command and on administrative due process, judicial review of military activities, and other topical issues. Gives students the opportunity to address and develop an understanding of the need for ethical conduct, and an awareness and sensitivity to ethical issues. *Prereq. Basic course completion.*

ARM 1403 Leadership Seminar and Ethics**2 QH**

Provides senior ROTC cadets with need-to-know information that facilitates their entry into active duty. Also provides a forum for the study of personnel, training, logistical, and installation support systems. Discusses personal finances as well as the officer and noncommissioned officer evaluation systems. Gives students the opportunity to address and develop an understanding of the professional ethics of officership, including the need for ethical conduct, and an awareness of and sensitivity to ethical issues. *Prereq. Basic course completion.*

NAV 1100 Naval Science Laboratory**0 QH**

Focuses on either drill instruction or practical work to complement classroom instruction. Must be taken in each class quarter by all NROTC students.

NAV 1101 Introduction to Naval Science
3 QH

Presents a general introduction to the naval profession and the concepts of seapower. Emphasizes the mission, organization, and warfare components of the United States Navy and Marine Corps. Includes an overview of officer and enlisted ranks and rates, training and education, and career patterns. Also covers naval courtesy and customs, military justice, leadership, and nomenclature. Exposes the student to the professional competencies required to become a naval officer.

NAV 1102 Naval Ships Systems 1
4 QH

Studies in detail ship characteristics and types, including ship design, hydrodynamic forces, stability, compartmentation, propulsion, electrical and auxiliary systems, interior communication, ship control, and damage control. Includes basic concepts of the theory and design of steam, gas turbine, and nuclear propulsion. Also discusses shipboard safety and firefighting. *Not required for nursing students.*

NAV 1201 Naval Ships Systems 2
4 QH

Outlines the theory and employment of weapons systems. Explores the processes of detection, evaluation, threat analysis, weapon selection, delivery, guidance, and explosives. Discusses fire control systems and major weapons types, including capabilities and limitation. Describes the physical aspects of radar and underwater sound in detail. Explores the facets of command, control, and communications as a means of weapons system integration. *Not required for nursing students.*

NAV 1202 Seapower and Maritime Affairs
3 QH

Surveys United States naval history from the American Revolution to the present with emphasis on major developments. Includes an in-depth discussion of the geopolitical theory of Mahan. Also treats present-day concerns in seapower and maritime affairs, including the economic and political issues of merchant marine commerce, the law of the sea, the Russian navy and merchant marine, and a comparison of United States and Soviet naval strengths.

NAV 1301 Navigation and Naval Operations 1
4 QH

Studies piloting and celestial navigation, including theory, principles, and procedures. Focuses on piloting navigation, including the use of charts, visual and electronic aids, and the theory and operation of magnetic and gyro compasses. Covers celestial navigation in depth, including the celestial coordinate system, an introduction to spherical trigonometry, the theory and operation of the sextant, and a step-by-step treatment of the sight reduction process. Gives students the opportunity to develop practical skills in both piloting and celestial navigation. Discusses other topics such as tides, currents, effects of wind and weather, plotting, use of navigation instruments, types and characteristics of electronic navigation systems, and the day's work in navigation. *Not required for nursing students.*

NAV 1302 Navigation and Naval Operations 2
4 QH

Studies the international and island rules of the nautical road, relative-motion-vector analysis theory, relative motion problems, formation tactics, and ship employment. Also includes introduction to naval operations and operations analysis, ship behavior and characteristics in maneuvering, applied aspects of ship handling, and afloat communications. *Not required for nursing students.*

NAV 1310 Evolution of Warfare
4 QH

Traces the development of warfare from the dawn of recorded history to the present, focusing on the impact of major military theorists, strategists, tacticians, and technological developments. Gives the student the opportunity to acquire a basic sense of strategy, to develop an understanding of military alternatives, and to see the impact of historical precedent on military thought and action. *Not required for nursing students.*

NAV 1401 Leadership and Management 1
3 QH

Studies at an advanced level organizational behavior and management in the context of the naval organization. Includes such topics as the management functions of planning, organizing, and controlling; individual and group behavior in organization; and motivation and leadership. Explores major behavioral theories in detail. Investigates practical applications by the use of experiential exercises, case studies, and lab discussions. Develops other topics, including decision making, communication, responsibility, authority, and accountability.

NAV 1402 Leadership and Management 2
3 QH

Studies naval junior officer responsibilities in naval administration. Exposes the student to a study of counseling methods, military justice administration, naval human resources management, directives and correspondence, naval personnel administration, material management and maintenance, and supply systems. As the capstone course in the NROTC curriculum, builds on and integrates the professional competencies developed in prior course work and professional training.

NAV 1410 Amphibious Warfare
4 QH

Surveys the historical development of amphibious doctrine and the conduct of amphibious operations. Emphasizes the evolution of amphibious warfare in the twentieth century, especially during World War II. Explores present-day potential and limitations on amphibious operation, including the rapid deployment force concept. *Not required for nursing students.*

Alternative Freshman-Year Program

ECN 4601 Economics 1

4 QH

Examines development of macroeconomic analysis, national income concepts, national income determination fluctuation and growth, role of the banking system and the Federal Reserve System, government expenditures and taxation, international trade, and balance of international payments.

ED 4001 Integrated Language Skills Development 1

2 QH

Strives to improve a student's reading comprehension and related study and language skills. Devotes time, discussion, and considerable practice to meaning skills such as basic reading comprehension and interpretation, including work in critical reading and other interpretational acts (inferences, understanding imagery, and symbolic usage). Focuses on study skills, previewing, finding main ideas and details, outlining and summarizing, continuous interaction, and interaction of all the communications skills—reading, writing, listening, and speaking.

ED 4002 Integrated Language Skills Development 2

2 QH

Continues discussion of topics introduced in ED 4001. *Prereq.* ED 4001.

ED 4003 Integrated Language Skills A

4 QH

Strives to improve a student's reading comprehension and related study and language skills. Devotes time, discussion, and considerable practice to meaning skills such as basic reading comprehension and interpretation, including work in critical reading and other interpretational acts (inferences, understanding imagery, and symbolic usage). Focuses on study skills, previewing, finding main ideas and details, outlining and summarizing, continuous interaction, and interaction of all the communications skills—reading, writing, listening, and speaking.

ED 4004 Integrated Language Skills B

4 QH

Extends ED 4003, with continued emphasis on study skills, including researching, organizing, and writing term papers. Explores critical thinking as it relates to the learning process. Also addresses the choices of academic major and career direction, emphasizing self-assessment and personal decision making. *Prereq.* ED 4003.

ENG 4013 Fundamentals of English 1

4 QH

Presents an intensive introduction to the principles of effective expository writing. Emphasizes description, paragraph construction, and organization. Reviews English usage, punctuation, and syntax. Includes essay assignments.

ENG 4014 Fundamentals of English 2

4 QH

Presents intensive instruction in exposition, argument, and academic essay writing and includes instruction in the writing of a research paper. Continues emphasis on English usage, punctuation, and syntax. Includes essay assignments.

HST 4110 History of Civilization A

4 QH

Covers the major ideas and institutions of civilization from ancient times to 1648.

HST 4111 History of Civilization B

4 QH

Continues HST 4110, covering the period since 1648.

MGT 4110 Survey of Business and Management

4 QH

Offers an introduction to the setting and general structure of American business, the characteristics of private enterprise, and the nature and challenge of capitalism and other forms of economic enterprise. Discusses the forms of business, the structure of organization, and the functions of management in the context of their influence on the various forms of business. Through lecture and class discussion, the student gives an overview of the methodologies used in planning, organizing, directing, and controlling the functions of production, marketing, sales, pricing, and finance.

MTH 1000 Mathematical Preliminaries 1

4 QH

Reviews precollege mathematics, primarily arithmetic. Covers operations with numbers, fractions, decimals, percents, and graphs (pictographs, bar graphs, circle graphs, etc.), together with applications of these skills and concepts.

MTH 1010 Mathematical Preliminaries 2

4 QH

Surveys precollege algebra, including signed numbers, exponents, multiplication of polynomials, factoring, linear equations, graphing, and radicals. For students whose background in algebra is weak.

MTH 1101 Basic Algebraic Applications

4 QH

Examines systems of linear equations and their graphs. Focuses on graphic systems of linear inequalities in two variables that apply to linear programming. Introduces matrices, matrix multiplication, and vectors. *Students do not receive credit for MTH 1101 if they have already received credit for MTH 1113.*

MTH 1113 College Mathematics for Business

4 QH

Examines sets, rectangular coordinates and graphs, functions and functional notation, linear and quadratic functions, exponential and logarithmic functions, systems of linear equations, summations, inequalities, permutations and combinations, elementary probability concepts, compound interest, and annuities.

POL 4106 Introduction to Politics

4 QH

Studies the basic political concepts and forces of organization from the classical Greeks to the modern nation-state. Contrasts the Soviet Union and the United Kingdom as contemporary illustrations of the institutional distinction between a totalitarian and a constitutional system.

SOC 4010 Principles of Sociology 1

4 QH

Introduces basic concepts and theories relating to the study of humans as participants in group life. Emphasizes socialization, culture, social structure, primary groups, family, social stratification, and population.

SOC 4011 Principles of Sociology 2

4 QH

Continues SOC 4010. Emphasizes critical analysis of American society, with attention to problems of social, political, urban, and industrial change.

Appendix

Campus Map



Key

Academic, residential,
and service buildings

Handicap parking

Accessible routes

Parking areas

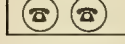
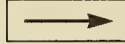
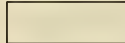
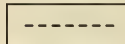
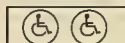
Street direction

Underground tunnel

Emergency telephone

TTY locations

See alphabetic list of buildings
for TTY locations.



Maps are provided by the Information Center, 115 Richards Hall, extension 2736 (TTY extension 3768). Some buildings on this map are used but not owned by Northeastern University. 8/93

Academic and Service Buildings

22	John D. O'Bryant African-American Institute (AF)	7	316 Huntington Avenue (Northeastern at the YMCA) (BY)
12	Barletta Natatorium (BN)	54	Huntington Plaza (271 Huntington Avenue) (HN)
19	Boiler Plant	10	Hurtig Hall (HT)
11	Cabot Physical Education Building (CB) TTY: Rm 110	26	Kariotis Hall (KA)
39	Cahners Hall (CA) TTY: Rm 151	41	Kerr Hall (Faculty Center) (KH)
28	Cargill Hall (CG)	29	Knowles Center (KN)
13	Churchill Hall (CH)	25	Lake Hall (LA) TTY: Rm 203
59	Columbus Place (716 Columbus Avenue) (CP)	57	Matthews Arena (MA)
56	Cotting School (CT)	58	Matthews Arena Annex (MX)
9	Cullinane Hall (CN)	20	Meserve Hall (ME) TTY: Rm 305
40	Cushing Hall (CU)	5	Mugar Life Science Building (Peabody Health Professions Center) (MU)
14	Dana Research Center (DA)	18	Nightingale Hall (NI) TTY: Rm 125
27	Dockser Hall (DK) TTY: Rm 107	31	Parker Building (PA)
6	Dodge Hall (DG)	2	Richards Hall (RI) TTY: Rms 150, 254
3	Eli Student Building (Auditorium) (EL) TTY: Rms 04, 104	8	Robinson Hall (RB)
4	Eli Student Center (Student Lounge) (EC) TTY: Rm 255	21	Ryder Hall (RY) TTY: Rms 170, 180, 251, 270
16	Forsyth Building (FR) TTY: Rms 100, 135	15	Snell Engineering Center (SN) TTY: Rm 120
17	Forsyth Building Annex (FA)	60	Snell Library (SL) TTY: Reference Desk
38	Forsyth Dental Building (FE)	50	122 St. Stephen Street (SS)
1	Hayden Hall (HA) TTY: Rms 120, 202	30	Stearns Center (ST) TTY: Rm 302
33	Hillel-Frager (HF)	32	26 Tavern Road (TA)
24	Holmes Hall (HO) TTY: Rm 276		
55	236 Huntington Avenue (HU)		

Residence Buildings

34	Burstein Hall	42	Melvin Hall
43	Kennedy Hall	35	Rubenstein Hall
46	142–148 Hemenway Street	44	Smith Hall
45	153/157–163 Hemenway Street	49	Speare Hall
7	316 Huntington Avenue (Northeastern at the YMCA)	48	Stetson East TTY (public)
52	319 Huntington Avenue	47	Stetson West
51	337 Huntington Avenue	50	106/110/116/122 St. Stephen Street
36	407 Huntington Avenue	23	Willis Hall
41	Kerr Hall	37	White Hall
53	Light Hall	61	400 The Fenway

Academic Calendar 1993–1994

1993

September	6	Monday	Labor Day. University closed.
	7–10	Tuesday–Friday	Summer final examinations for undergraduate day colleges.
	13–17	Monday–Friday	Division A vacation
	14	Tuesday	Fall commencement
	19–21	Sunday–Tuesday	Orientation and registration for freshmen and transfer students.
	20	Monday	Upperclass registration (Division A) 8:30 AM
	22	Wednesday	Classes begin in undergraduate day colleges for fall quarter at 8 AM
<hr/>			
October	11	Monday	Columbus Day. University closed.
<hr/>			
November	11	Thursday	Veterans Day. University closed.
	25	Thursday	Thanksgiving Day. University closed.
	25–27	Thursday–Saturday	Thanksgiving recess. University closed except key offices.
<hr/>			
December	10–16	Friday–Thursday	Fall final examinations for undergraduate day colleges.
	20–Jan. 1	Monday–Saturday	Christmas vacation. University closed except key offices.

1994

January	1	Saturday	New Year's Day. University closed.
	3	Monday	Orientation and registration for new freshmen and transfer students; registration for continuing September freshmen and returning upperclass students (Division B).
	5	Wednesday	Classes begin in undergraduate day colleges for winter quarter at 8 AM.
	17	Monday	Martin Luther King, Jr.'s Birthday observed. University closed.
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February	21	Monday	Presidents' Day. University closed.
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March	21–26	Monday–Saturday	Winter final examinations for undergraduate day colleges.
	28–April 2	Monday–Saturday	Division B vacation.
<hr/>			
April	4	Monday	Orientation and registration for new freshmen and transfer students, continuing September and January freshmen, and returning upperclass students (all seniors and Division A).
	6	Wednesday	Classes begin in undergraduate day colleges for spring quarter at 8 AM.
	18	Monday	Patriots' Day. University closed.
<hr/>			
May	30	Monday	Memorial Day. University closed.

June	13–17	Monday–Friday	Spring final examinations for undergraduate day colleges.
	18	Saturday	Commencement.
	20–24	Monday–Friday	Division A vacation.
	27	Monday	Registration for Division B and D and January freshmen (Quarter 3).
	28	Tuesday	Classes begin in undergraduate day colleges for summer quarter at 8 AM.
July	4	Monday	Independence Day observed. University closed.
September	5	Monday	Labor Day. University closed.
	6–9	Tuesday–Friday	Summer final examinations for full-time undergraduate programs.
	12–16	Monday–Friday	Division B vacation.
	13	Tuesday	Fall Commencement.
	18–20	Sunday–Tuesday	Beginning of 1994–1995 academic year. Orientation, advising, and registration begin for new students and returning Division B students.
	21	Wednesday	Classes begin in undergraduate day colleges for fall quarter at 8 AM.

Calendar dates are subject to change. The University community will be notified if such changes are necessary.

Registrar's Quarterly Registration Calendar

Fall 1993

September 19–December 16

Course registrations	May 13, July 29	7:30 AM	Ell Ballroom
Drop/add	June 1, 2	9:00–3:00	
	September 8–10	9:00–7:00	
University registration		You must sign "I'm Here"	
New students	September 19	1:00–4:00	
Returning students	September 20	9:00–12:00	
	September 21*	9:00–4:00	
Drop/add	September 20	9:00–12:00	
	September 21	9:00–4:00	
	September 22–24, 27, 28	9:00–3:00	
Classes begin	September 22	8:00 AM	
W grades	October 15	Last day to drop without a W grade	
	November 19	Last day to drop with a W grade	
Reading days	December 8, 9		
Final exam week	December 10–16		
Grades due	December 20	All grades mailed the following day	

Winter 1994

January 3–March 25

Course registrations	May 27, October 28	7:30 AM	Ell Ballroom
Drop/add	June 10, 11, November 17, 18	9:00–3:00	
	December 13–15	9:00–7:00	
University registration		You must sign "I'm Here"	
and drop/add	January 3	11:00–3:00	
	January 4*	9:00–4:00	
Drop/add continues	January 5–7, 10, 11	9:00–3:00	
Classes begin	January 5	8:00 AM	
W grades	January 21	Last day to drop without a W grade	
	February 25	Last day to drop with a W grade	
Final exam week	March 21–25		
Grades due	March 29	All grades mailed the following day	

*If you do not sign "I'm Here" and clear any registration blocks by this date, your course registrations will be cancelled at 4:00 PM.

Spring 1994		April 4–June 17	
Course registrations	November 10, January 27	7:30 AM	Ell Ballroom
Drop/add	November 30, December 1 February 16, 17 March 23–25	9:00–3:00 9:00–3:00 9:00–7:00	
University registration and drop/add	April 4 April 5*	You must sign "I'm Here" 11:00–3:00 9:00–4:00	
Drop/add continues	April 6–8, 11, 12	11:00–3:00	
Classes begin	April 6	8:00 AM	
W grades	April 22 May 27	Last day to drop without a W grade Last day to drop with a W grade	
Classes end for seniors	June 3		
Senior grades due	June 6		
Final exam week	June 13–17		
Commencement	June 18		
Grades due	June 21	All grades mailed the following day	
Summer 1994		June 27–September 9	
Course registrations	February 17, April 21	7:30 AM	Ell Ballroom
Drop/add	March 9, 10, May 11, 12 June 15–17	9:00–3:00 9:00–7:00	
University registration and drop/add	June 27*	You must sign "I'm Here" 9:00–4:00	
Drop/add continues	June 28–30, July 5–7	9:00–3:00	
Classes begin	June 28	8:00 AM	
W grades	July 14 August 18	Last day to drop without a W grade Last day to drop with a W grade	
Classes end for seniors	September 1		
Senior grades due	September 6		
Final exam week	September 6–9		
Commencement		September 13	

*If you do not sign "I'm Here" and clear any registration blocks by this date, your course registrations will be cancelled at 4:00 PM.

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The *Northeastern University Undergraduate Catalog Full-Time Day Programs* contains the University's primary statements about these academic programs and degree requirements, as authorized by the president or Board of Trustees. For information about other academic policies and procedures; student responsibilities, academic and cocurricular life; faculty rights and responsibilities; or general personnel policies, benefits, and services, please refer to the *Academic Operations Manual*, *Undergraduate and Graduate Student Handbook*, *Cooperative Education Handbook*, *Faculty Handbook*, *Benefits and Services Handbook*, and related procedural guides as appropriate.

Accreditation. Northeastern University is accredited by the New England Association of Schools and Colleges, Inc.

Delivery of Services. Northeastern University assumes no liability for delay or failure to provide educational or other services or facilities due to causes beyond its reasonable control. Causes include, without limitation, power failure, fire, strikes by University employees or others, damage by natural elements, and acts of public authorities. The University will, however, exert reasonable efforts, when it judges them to be appropriate, to provide comparable services, facilities, or performance; but its inability or failure to do so shall not subject the University to liability.

The *Northeastern University Undergraduate Catalog* contains current information about the University calendar, admissions, degree requirements, fees, and regulations; however, such information is not intended and should not be regarded to be contractual.

Northeastern University reserves the sole right to promulgate and change rules and regulations and to make changes of any nature in its program, calendar, admissions policies, procedures, and standards, degree requirements, fees, and academic schedule whenever necessary or desirable, including, without limitation, changes in course content and class schedule, the cancellation of scheduled classes and other academic activities, and the substitution of alternatives for scheduled classes and other academic activities. In any such case, the University will give whatever notice is reasonably practical.

Northeastern University will endeavor to make available to its students a fine education and a stimulating and congenial environment. However, the quality and rate of progress of an individual's academic career and professional advancement upon completion of a degree or program are largely dependent on his or her own abilities, commitment, and effort. In many professions and occupations there are also requirements imposed by federal and state statutes and regulatory agencies for certification or entry into a particular field. These requirements may change while a student is enrolled in a program and may vary from state to state or country to country. Although the University stands ready to help its students find out about requirements and changes in them, it is the student's responsibility to initiate the inquiry.

Tuition Default. In cases where the student defaults on his/her tuition, the student shall be liable for the outstanding tuition and all reasonable associated collection costs incurred by the University, including attorneys' fees.

Emergency Closing of the University. Northeastern University has made arrangements to notify students, faculty, and staff by radio when it becomes necessary to cancel classes because of extremely inclement weather. AM radio stations WBZ (1030), WEEI (590), WHDH (850), WRKO (680), and FM station WBCN (104.1) are the stations authorized to announce the University's decision to close. Since instructional television courses originate from live or broadcast facilities at the University, neither the classes nor the courier service operate when the University is closed. You are encouraged to listen to the radio to determine whether the University will be closed.

If a storm occurs at night, the announcement of University closing is given to the radio stations at approximately 6 AM. Classes are generally cancelled for the entire day and evening at all campus locations unless stated otherwise. When a storm begins later in the day, cancellations of evening classes may be announced. This announcement is usually made between 2-3 PM.

Equal Opportunity Policy. Northeastern University does not discriminate on the basis of race, color, religion, sex, sexual orientation, age, national origin, disability, or veteran status in admission to, access to, treatment in, or employment in its programs and activities. In addition, Northeastern University will not condone any form of sexual harassment. Handbooks containing the University's nondiscrimination policies and its grievance procedures are available in the Office of Affirmative Action, 175 Richards Hall. Inquiries regarding the University's nondiscrimination policies may be directed to:

Ellen S. Jackson, Dean/Director
Office of Affirmative Action
175 Richards Hall
Northeastern University
Boston, Massachusetts 02115
617-373-2133

Inquiries concerning the application of nondiscrimination policies may also be referred to the Regional Director, Office for Civil Rights, United States Department of Education, J.W. McCormack Building, Post Office Court House, Room 222, Boston, Massachusetts 02109-4557.

Family Educational Rights and Privacy Act. In accordance with the Family Educational Rights and Privacy Act of 1974, Northeastern University permits its students to inspect their records wherever appropriate and to challenge specific parts of them when they feel it is necessary to do so. Specific details of the law as it applies to Northeastern are printed in the Undergraduate and Graduate Student Handbook and are distributed annually at registration of the University's colleges and graduate schools.

Persistence Rates under the Student Right-To-Know Act. In the fall of 1992, the persistence rate for students who entered in the fall-1991 cohort was 69.3 percent.

Mission Statement. Northeastern University is dedicated to providing a diverse student population with an academic program and a course of professional preparation of the highest quality. The University values equally knowledge for its own sake, knowledge as a means to success in the workplace, and knowledge as a cornerstone of personal achievement and satisfaction. As a private, urban university, Northeastern is determined to maintain its reputation as a friend to the city of Boston and a partner of the Commonwealth of Massachusetts.



Office of the Registrar
120 Hayden Hall
Northeastern University
Boston, Massachusetts 02115

1993-1994

PART-TIME UNDERGRADUATE PROGRAMS

Bulletin

**UNIVERSITY
COLLEGE**

Northeastern University

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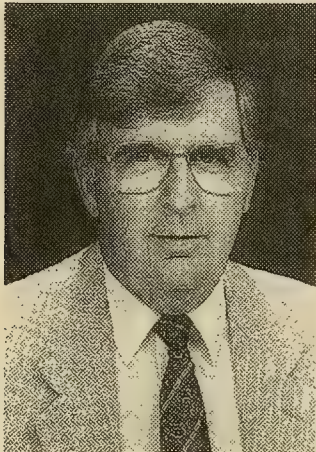
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About University College

...The Remarkable Part-time Undergraduate Division of Northeastern University



John W. Jordan
Dean, University College

It is a pleasure each year to welcome you to University College and to tell you a little bit about this remarkable institution.

We are called University College because we embody the best of two academic worlds. As an integral part of a great university, we provide you with the energies and resources of a multifaceted dynamic institution. As a pioneer of adult education we bring you a "can-do" spirit, infused with creativity, academic vitality and practical savvy.

Our faculty is a rich blend of full-time professors and practicing professionals, including corporate executive officers, published authors, health practitioners, and government leaders.

Our programs reflect the premium we place on quality and innovation. They are constantly evaluated and updated to respond to the changing professional needs and personal interests of adult learners. One admirable product of this invigorating process is our campaign to make University College "The Write Place." It is a source of special pride to us, and I urge you to read more about it by turning to page 6 in this Bulletin.

But if you are looking for the heart and soul of University College, look no further than yourself, the adult student. You are the indomitable spirit that inspires us. We know your thirst for enrichment and improvement. We understand the juggling you do and the stresses you endure. We admire the courage it takes to come back and keep at it. We are familiar with your dreams and aspirations and we are dedicated to help you get to where you want to be.

Thus, with your plans and ideas as a guide, you can set your sights on any direction at University College. Consider this Bulletin one of many road maps, and our faculty, counselors, and administrators your mentors and advocates. Remember: you are what is most remarkable about University College and we will always be there for you.

Good luck!

John W. Jordan

1993-1994 Registration Calendar

Fall Quarter Registration Dates for Classes that begin Monday, September 27

Boston		
Tuesday-Friday	September 7-10	9:30 a.m.-7:00 p.m.
Saturday	September 11	9:00 a.m.-12:00 noon
Monday-Wednesday	September 13-15	9:30 a.m.-7:00 p.m.
Burlington		
Wednesday-Thursday	September 8-9	5:30-8:00 p.m.
Friday	September 10	4:00-8:00 p.m.
Monday-Tuesday	September 13-14	5:30-8:00 p.m.
Chelmsford		
Thursday & Tuesday	September 9 & 14	5:30-8:00 p.m.
Dedham		
Thursday and Monday	September 9 & 13	5:30-8:00 p.m.
Framingham		
Tuesday and Monday	September 7 & 13	5:30-8:00 p.m.
Liberty Square		
Tuesday-Thursday	September 7-9	11:00 a.m.-7:00 p.m.
Monday-Tuesday	September 13-14	11:00 a.m.-7:00 p.m.
Malden		
Wednesday and Monday	September 8 & 13	5:30-8:00 p.m.
Marlboro		
Wednesday and Monday	September 8 & 13	5:30-8:00 p.m.
Marshfield		
Thursday and Tuesday	September 9 & 14	5:30-8:00 p.m.
Milford		
Thursday and Tuesday	September 9 & 14	5:30-8:00 p.m.
Stoneham		
Thursday and Tuesday	September 9 & 14	5:30-8:00 p.m.
Westwood		
Thursday and Tuesday	September 9 & 14	5:30-8:00 p.m.
Weymouth		
Wednesday and Monday	September 8 & 13	5:30-8:00 p.m.

Fall: Special Dates

Columbus Day observed:
Monday, October 11

Veteran's Day:
Thursday, November 11

Thanksgiving Recess:
Thursday-Saturday
November 25-27

Final Examination Period:
Monday-Saturday
December 13-18

Christmas Vacation:
Monday-Sunday
December 20 - Jan. 2

Winter Quarter Registration Dates for Classes that begin Monday, January 3

Boston		
Monday-Thursday	Dec. 6-Dec. 9	9:30 a.m.-7:00 p.m.
Burlington		
Monday-Wednesday	Dec. 6-Dec. 8	5:30-8:00 p.m.

Winter Quarter Registration Dates (continued)

Chelmsford		
Tuesday	December 7	5:30-8:00 p.m.
Dedham		
Monday-Wednesday	Dec. 6-Dec. 8	5:30-8:00 p.m.
Framingham		
Monday-Wednesday	Dec. 6-Dec. 8	5:30-8:00 p.m.
Liberty Square		
Monday-Wednesday	Dec. 6-Dec. 8	11:00 a.m.-7:00 p.m.
Malden		
Monday	December 6	5:30-8:00 p.m.
Marlboro		
Monday	December 6	5:30-8:00 p.m.
Marshfield		
Tuesday	December 7	5:30-8:00 p.m.
Milford		
Tuesday	December 7	5:30-8:00 p.m.
Stoneham		
Tuesday	December 7	5:30-8:00 p.m.
Westwood		
Monday-Wednesday	Dec. 6-Dec. 8	5:30-8:00 p.m.
Weymouth		
Monday-Wednesday	Dec. 6-Dec. 8	5:30-8:00 p.m.

Winter: Special Dates

**Martin Luther King, Jr.'s
birthday observed:**
Monday, January 17

Presidents' Day observed:
Monday, February 21

Final Examination Period:
Monday-Saturday
March 21-26

Spring Recess:
Monday-Sunday
March 28 - April 3

Spring Quarter Registration Dates for Classes that begin Monday, April 4

Boston		
Monday-Thursday	March 14-17	9:30 a.m.-7:00 p.m.
Burlington		
Monday-Wednesday	March 14-16	5:30-8:00 p.m.
Chelmsford		
Tuesday	March 15	5:30-8:00 p.m.
Dedham		
Monday-Wednesday	March 14-16	5:30-8:00 p.m.
Framingham		
Monday-Wednesday	March 14-16	5:30-8:00 p.m.
Liberty Square		
Monday-Wednesday	March 14-16	11:00 a.m.-7:00 p.m.
Malden		
Monday	March 14	5:30-8:00 p.m.
Marlboro		
Monday	March 14	5:30-8:00 p.m.

Spring: Special Dates

Patriot's Day observed:
Monday, April 18

Memorial Day observed:
Monday, May 30

Final Examination Period:
Monday-Saturday
June 13-18

Commencement:
Saturday, June 18

Spring Quarter Registration Dates (continued)

Marshfield		
Tuesday	March 15	5:30-8:00 p.m.
Milford		
Tuesday	March 15	5:30-8:00 p.m.
Stoneham		
Tuesday	March 15	5:30-8:00 p.m.
Westwood		
Monday-Wednesday	March 14-16	5:30-8:00 p.m.
Weymouth		
Monday-Wednesday	March 14-16	5:30-8:00 p.m.

**Summer Quarter Registration Dates
for Classes that begin Monday, June 20**

Registration for entire Summer Quarter:

Boston		
Monday-Thursday	June 6-9	9:30 a.m.-7:00 p.m.
Burlington		
Monday-Wednesday	June 6-8	5:30-8:00 p.m.

**Second Summer Quarter Registration Dates
for Classes that begin Monday, July 25**

Registration for second five-week term:

Boston		
Monday-Tuesday	July 11-12	9:30 a.m.-7:00 p.m.
Burlington		
Monday	July 11	5:30-8:00 p.m.

Summer: Special Dates

Independence Day:
Monday, July 4

Labor Day:
Monday, September 5

Final Examination Period:
Last class session of
each term

We're Here to Help You. . . .

Programs That Work For You

Naturally, Northeastern University offers all the traditional academic programs you expect from a large university, including timely and innovative programs in **Business Administration, Criminal Justice and Security, Health Professions and Sciences, and Liberal Arts**. Among these programs are five bachelor's degree concentrations in business that carry the extra prestige of full accreditation by the American Assembly of Collegiate Schools of Business.

Many students come to Northeastern University to take specific, job-related courses. To serve these students, we have developed more than fifty **certificate programs**. In most cases, these programs incorporate or build on the major concentration courses required in each of our professionally focused undergraduate degree programs.

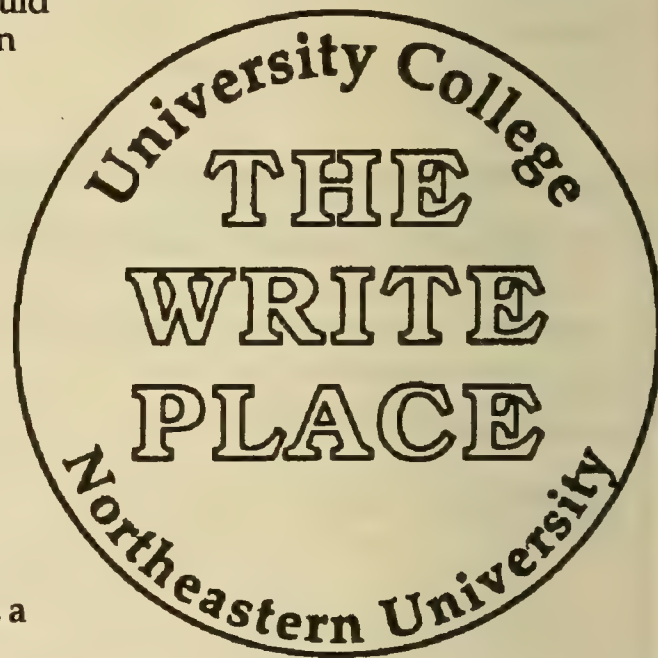
Northeastern also offers practical, part-time **associate degree programs** for students who are seeking a first-rate, first-level college degree, as well as **bachelor's degrees** in all four areas: Business Administration, Criminal Justice and Security, Health Professions and Sciences, and Liberal Arts.

The "Write" Skills To Empower You

The purpose of University College has always been to provide the adult student with educational opportunities designed to enrich personal and interpersonal experiences and to prepare the student for success in his or her chosen field. This purpose is, of necessity, many-faceted, and often quite career-specific. Nevertheless it is our belief that every University College experience should rest on a strong foundation of communication skills, and that writing skills in particular should be cultivated continually as critical to each student's overall progress.

We believe that writing can be singled out for such universal attention because a student who has learned to write well has also learned to think clearly, and therefore has learned how to learn. This is a skill that transcends subject area, a tool that can be brought to bear in any situation, with the inevitable result of affording each student continuing self-respect and the respect of others.

This is why we are determined to make University College "The Write Place," that is, a place where our students will be given every opportunity to improve their writing skills and to employ them as tools for success in their academic, professional and personal lives. We understand the need our students have to gain an edge in a complex society and we have developed the "write" means to help them attain such an advantage. Some call this Write Place campaign "a vehicle for empowerment." As true as that may be, we prefer to consider it as our tribute to the creative potential of our students.



...Get to Where You Want To Be

Faculty Steeped in Knowledge and Experience

A course is only as good as its teacher. That's why University College carefully selects both full-time Northeastern University faculty and practicing professionals from other academic institutions as well as a wide array of specialized fields for its teaching staff of 1,000. Bringing an extra dimension into our classrooms are corporate executive officers, published authors, established health professionals, artists, graphic designers, computer experts, lawyers, professors, and others. They offer students the benefit of their experience and current information about how careers in their fields are changing. Many have found teaching adults particularly rewarding and have expressed their pleasure at having such committed, hard-working, and enthusiastic students.

Students Who Bring Rich Experiences to Class

Approximately 12,000 adults come to University College every year to pursue a degree, update their careers with a certificate, or take a course in a subject that has long interested them. These adult students range in age from 18 to 80 and come from all walks of life: women re-entering the work force, young men and women seeking to start new careers, older people polishing their skills, people of every age intent on finishing an education that time or circumstances interrupted. All have one thing in common—they are making a change in their lives through their own actions, expanding their world by investing in themselves. This diversity is a source of stimulation and enrichment for all—students, faculty, and administration alike.

Schedules “in Sync” With Your Lifestyle

We know you're busy, and finding the time to continue your education can be a real challenge. To help you out, Northeastern not only schedules classes at **fourteen different locations** in eastern Massachusetts, but also provides different course formats. While most courses are offered on a twelve week schedule, some courses are offered in five and six week formats to accommodate the complex lives of many adults. Also, for those of you who would like to accelerate the educational process, University College offers numerous intensive courses which are generally equivalent to two regular courses. These intensives can be found on our schedules almost every night, and they are available at a reduced tuition rate.

Class Size Conducive to Learning

Everyone knows Northeastern is big. What many people don't realize is that because we operate at fourteen different locations, our classes tend to be small. And many of our specialized degree and certificate programs enroll only small numbers of students because of their unique focus. Last year, our average class size was fifteen students. Many classes ran with fewer students, and only 10 percent of all classes offered ran with enrollments larger than twenty-seven.

We're Here to Help You. . . .

Counseling and Personal Career Search Activities To Bring Your Plans Into Focus

University College offers a wide range of career and academic counseling services to assist you in making both educational and career decisions. The College provides academic advisors and career counselors, offers credit and noncredit career-planning programs, and serves as a link to other student support services offered by Northeastern University.

Open House Programs

If you are thinking about enrolling in University College for the first time, you are encouraged to attend an Open House. Open Houses introduce potential students to the many University College programs and services designed to meet your educational, job-related, and personal needs. They also orient new students to the University as a whole and address concerns that many adult, part-time students have about

- transfer credit
- admission to degree programs
- international student applications
- certificate programs
- course selection

Students currently enrolled in University College are also invited to attend an Open House.

Open Houses are ordinarily scheduled each quarter at selected campus sites at or about the same time that registration takes place. Details appear in the *Schedule Guide* for each term.

Academic Advising

Academic advisors are available by appointment to talk with University College students and prospective students about courses, transfer credit, degree requirements, career counseling referrals, and other matters of individual concern. Persons requiring any support services such as a sign language interpreter should mention this at the time the appointment is being made. Please refer to information on the Disabilities Resource Center for the information.

To make an appointment at a specific campus, please call the appropriate number, as listed below.

- *Main Boston Campus:* Advisors are available weekdays from 8:30 a.m. to 7 p.m. Call 617-373-2400 or TTY 617-373-2825.
- *Burlington Suburban Campus:* Call 617-373-5544. (Note: this is a Boston campus phone number)
- *Downtown Boston Campus (5 Liberty Square):* Call 617-367-6373.
- *All other branch locations:* Advisors are available from 5:30 to 7 p.m. on the evenings when classes are in session. Call 617-373-5544 for an appointment.

During registration, the advising staff in Boston is available to meet with students on a walk-in basis from 9 a.m. to 7 p.m. Students may also call in with questions during these times. In addition, registration advisors are available at satellite campuses during most registration hours to assist students with course selection and to explain registration procedures.

...Get the Attention You Deserve

Tutorial Services

University College offers tutorial assistance in several subjects. Tutoring, which is on a one-to-one basis, provides an opportunity for student and tutor to focus on specific problems that might not have been covered during class time. You may request tutorial information from the Office of Academic and Student Affairs, 617-367-6373. A flyer describing tutorial services is also available at all campus locations.

Career Services to Guide You Through Your Next Transition

Career Development Courses

Often one of the strongest motivations for continuing education is the desire for career advancement or change. In order to help students develop career and educational planning skills, University College offers a three-quarter-hour course in career development (INT 4110) called *Managing Career Decisions*. There are also two shorter versions of this course for 1 q.h. each: *Career Action Planning* (INT 4112) and *Career Decision Making* (INT 4114). For more information, see the course descriptions on page 207 of this *Bulletin*.

Career Services

The primary purpose of the **Department of Career Services** is to assist all students, alumni and members of the Northeastern University community in developing and implementing successful career plans. For additional information contact:

Northeastern University
Department of Career Services
P.O. Box 895
Boston, MA 02117
617-373-2430

Office Hours: 120 Ryder Hall
Sept.-June: 8:30-4:30, Monday-Friday

In addition, the **Career Resource Center**, located in 124 Ryder Hall, is open until 8:00 p.m. most Tuesdays for counseling appointments and general use of print resources.
Summer Quarter: 8:00-5:00, Monday-Thursday.

Career Counseling

Career counseling is available to help matriculated students make sound career decisions. Depending on individual needs, career counseling might include: planning a career or a career change, making decisions, setting short and long term goals, developing effective job search strategies or participating in videotaped mock interviews. Students decide with the counselor whether they need one or more sessions. Career counseling is by appointment in Boston and may be arranged by calling 617-373-2430.

Job Search Seminars

Whether you are a seasoned job hunter or a beginner, seminars are designed to prepare you to compete effectively in today's market. Meeting the demands of the current marketplace, topics include: self-assessment, the latest in job search strategies, how to target your resume and write dynamic cover letters, and how to prepare for successful interviewing. Seminars are offered during the day and evening hours throughout the year. Since space is limited, advance registration is required.

Evening seminars take place in Boston and Burlington and are announced in classes prior to the start of each series. Students who wish to participate in these seminars must reserve a place by calling the Department of Career Services at 617-373-2428.

Career Resource Center

The Career Resource Center, located in 124 Ryder Hall, provides a variety of services and resources:

- a book collection containing occupational information, resume and interviewing resources, job search guides and directories of employers and graduate schools;
- a Job Bank containing current local, national, and international job opportunities and internships;
- employer files containing annual reports, product information and descriptions of entry-level position and training programs;
- daily walk-in hours for assistance with resumes and correspondence.

Career Expos

University College students are welcome to attend the Career Expos held during the fall and winter quarters. This year's Expos will focus on various careers in health care, environment, business and finance, and high tech. Employers from business, industry, government and nonprofit agencies participate in each of these events. Students and alumni have the opportunity to meet informally with prospective employers to discuss career options and job opportunities.

On-Campus Recruiting

All students receiving a bachelor's degree in the current academic year are eligible to interview with organizations recruiting on campus. Organizations typically range from larger international corporations to smaller non-profit organizations. The fall and winter recruiting seasons attract 250 employers who conduct over 3,000 interviews.

Resume Matching

When employers notify us of professional vacancies, they often ask us to refer eligible candidates. The Department of Career Services, therefore, maintains a database of seniors and alumni/ae who are looking for career opportunities. Resumes of all candidates meeting the qualifications specified by the employer are forwarded for consideration. Employers then contact the candidates they wish to interview.

Northeastern National Career Network

The Northeastern National Career Network (NNCN) is a voluntary organization of Northeastern alumni/ae and other professional affiliates who are willing to share information on their career fields. NNCN members offer insight into industry trends, their own career experiences, an overview of their field and information on job opportunities. Whether you are an undergraduate trying to focus on your career direction or an alumnus/alumna or graduate student making a career change, NNCN members are an extremely valuable source of information and contacts. The NNCN materials are located in the Career Resource Center, 124 Ryder Hall.

Reciprocity

The Department of Career Services establishes reciprocal agreements with colleges and universities throughout the country to provide career assistance to our alumni/ae

relocating outside of Massachusetts. We will write up to three letters on your behalf to other schools.

For additional information, a counseling appointment, or to sign up for a seminar, contact the Department of Career Services at 617-373-2430.

The Counseling Center

Students can receive confidential counseling and testing to address personal, educational, or career concerns. Assistance is available to all students during days and some evening hours at the Counseling Center. For information and appointments, call 617-373-2142 or drop in at 302 Ell Building.

People come to the Center for help with a variety of personal concerns. Anxiety and depression, adjustment reactions to college life, personal or family relationship concerns, drug and alcohol abuse, and sexual adjustment questions are among the issues that University College students may want to discuss with a professional therapist. The Center is committed to short-term therapy, with a maximum of twelve consecutive counseling sessions. If the Center cannot meet your needs, appropriate referrals are provided.

Academic and life skills development workshops are offered each term, generally during the day. The Study Skills Development Workshop, among the most popular, helps students become more effective in organizing their time, taking notes, preparing for exams, and other areas of academic performance. Videotapes of this workshop and a Procrastination Workshop may be viewed at the Center during day or evening hours. Other workshops include Stress Management, Surviving Parental Alcoholism, and Incest Survivors.

With so many fields to choose from, students sometimes have difficulty selecting a major or a career. You may want help in defining your interests, abilities, and values. At the Center, education-vocational counseling usually involves an evaluation of the student's interests, aptitudes, abilities, values, and personality characteristics. Many kinds of tests, available at the Center, may be used in this process. Counseling is done on an individual basis.

Information and application packets for such standardized tests as the GRE, LSAT, GMAT, MAT, and CLEP exams are available at the Center. CLEP exams are given at the Center ten times each year to NU students, and the Center is also a national testing site for the LSAT, GMAT, MAT, and other exams. Call 617-373-4142 for information.

The Disability Resource Center

The Disability Resource Center's (DRC) mission within the University is to enable people with disabilities equal access to higher education via support services and advocacy. The Center provides support services on an individual basis. Accommodations include but are not limited to: orientation, academic and general counseling, and approval of HP parking.

Prior to receiving services, individuals who have both visible and hidden disabilities must voluntarily request to register their disability-related needs by opening a file with the DRC. Registering with the DRC is done by providing the DRC with recent diagnostic documentation of their disability. During the Center's registration process, services are individually designed to meet the student's needs. Support services are available for the following disability groups' needs but are not limited to: students who are learning disabled; students who are head injured; students who have mobility disabilities or are wheelchair users; students who are Deaf and hard of hearing; students who are blind or visually disabled; students with degenerative or chronic conditions and students with mental health disorders.

The Disability Resource Center meets with student organizations such as the Disabled Student Organization of Northeastern University, the Deaf Club and AD-IN Lead In. Call 617-373-2675 or TTY 617-373-2730 for assistance.

University College Offices

General Information:

617-373-2400

TTY: 617-373-2825 (for the
hard of hearing only)

Office of the Registrar

120 Hayden Hall

617-373-2300

Monday-Thursday,

8:30 a.m.-7:30 p.m.

Friday, 8:30 a.m.-4:30 p.m.

Boston Main Campus

180 Ryder Hall

360 Huntington Avenue

617-373-2400

TTY: 617-373-2825

(for the hard of hearing only)

Monday-Friday,

8:30 a.m.-8:30 p.m.

Saturday, 8:30 a.m.-1 p.m.

Downtown Boston Campus

5 Liberty Square

617-367-6373

Monday-Thursday,

7 a.m.-10 p.m.*

Friday, 8:30 a.m.-4:30 p.m.*

Burlington Suburban Campus

South Bedford Road

617-272-5500

Monday-Friday, 8 a.m.-10 p.m.

Saturday, 8 a.m.-12 noon

Burlington High School

123 Cambridge Street

617-270-1838

Monday-Thursday,

5:30-10 p.m.

Chelmsford High School

200 Richardson Road

508-251-8792

Tuesday & Thursday,

5:30-10 p.m.

Dedham Campus

Common Street

617-320-8000

Monday-Thursday,

8 a.m.-10 p.m.

Friday, 8:30 a.m.-4:30 p.m.

Saturday, 8 a.m.-1:00 p.m.

Framingham High School

A Street

508-877-2333

Monday-Thursday, 5:30-10 p.m.

Malden High School

77 Salem Street

617-322-1441

Monday & Wednesday, 5:30-10 p.m.

Marlboro High School

Bolton Street

508-485-4122

Monday & Wednesday, 5:30-10 p.m.

Marshfield High School

Forest Street

617-837-1835

Tuesday & Thursday, 5:30-10 p.m.

Milford High School

31 West Fountain Street

508-473-2565

Tuesday & Thursday, 5:30-10 p.m.

Stoneham High School

149 Franklin Street

617-438-6407

Tuesday & Thursday, 5:30-10 p.m.

Westwood High School

200 Nahatan Street

617-329-3030

Monday-Thursday, 5:30-10 p.m.

Weymouth Junior High School

360 Pleasant Street

617-335-9112

Monday-Thursday, 5:30-10 p.m.

*Office hours may vary due to
changes in class schedules.

Summer Office Hours

Office of the Registrar
120 Hayden Hall
Monday-Thursday,
8:30 a.m.-7:30 p.m.

Boston Main Campus
180 Ryder Hall
Monday-Thursday,
8 a.m.-8:30 p.m.

Downtown Boston Campus
5 Liberty Square
Monday-Thursday,
7:30 a.m.-10 p.m.*

Burlington Suburban Campus
Monday-Thursday,
8 a.m.-10 p.m.

Dedham Campus
Monday-Thursday,
8:30 a.m.-10 p.m.

Framingham High School
Tuesday and Thursday,
5:30-10 p.m.

Weymouth Junior High School
Tuesday and Thursday,
5:30-10 p.m.

*Office hours may vary due to
changes in class schedules.

Policies and Procedures

Admissions

University College has an open enrollment policy that enables students to take most courses and certificate programs simply by registering for the course. Applications for admission, entrance examinations, and College Board Examination scores are not required. Credits earned for individual courses taken at University College may be applied to a certificate or degree program.

However, students who are enrolled at University College and who decide to pursue a degree program must apply for admission to the program. Requirements include proof of high school completion, a 2.0 q.p.a. and completion of the Critical Writing sequence. Special requirements apply to students entering degree programs such as the Associate in Science in Radiologic Technology, the Bachelor of Science in Business Administration degree and Bachelor of Science in Nursing program. For information on the admissions process for these programs, please see pages 121-2, 69, and 118 respectively. Students must be admitted to a degree program in order to be eligible for most financial aid. See page 260 for more information on obtaining financial aid. All international students must be admitted to a degree program in order to apply for an I-20 form. See page 16 for more information on international students. There is a separate procedure for entering Certificate programs. See page 37.

Both degree and nondegree students are entitled to make use of the student support services offered by University College. Call 617-373-2400 for more information.

Registration

Students may register for courses by mailing in the registration form available in the back of the *Schedule Guide* during the mail-in registration period or reporting to any University College campus during the registration periods that are scheduled each quarter. It is not necessary to register at the campus where a particular course actually meets; students may register at any campus for a course scheduled at any other campus. Attendance at class, even with the instructor's permission, does not constitute registration unless the student has filled out a registration form. Academic credit will not be awarded to students who are not properly registered. See the Academic Calendar on pages 3-5 for a complete registration schedule.

Courses listed in this *Bulletin* are not necessarily offered each quarter. *Students may not be able to take all of the courses required for a particular program at any one campus location.* Each Fall, Winter, Spring, and Summer quarter the list of courses being offered is printed in a University College *Schedule Guide*. *Schedule Guides* are distributed at all campus locations several weeks prior to registration. To request a schedule by mail, call 617-373-2400 or TTY 617-373-2825.

Course Selection

Academic advisors (see page 8) are available by appointment at all campuses, to help students plan their academic programs and select courses.

Students who have earned credits from other schools are urged to have their transcripts evaluated prior to the registration period to avoid duplicating coursework completed elsewhere. Students should allow *at least four weeks from the time all transcripts have been received for processing transfer credit petitions.* During the official registration periods at all campuses, advisors are available without an appointment to answer general questions and to help students make initial course selections. Because the process of evaluating transfer credit is complex, students should not expect advisors to evaluate their petitions during advising appointments.

Attendance

University College expects students to meet attendance requirements in all courses to qualify for credit. Attendance requirements vary, and it is the student's responsibility to ascertain what each instructor requires. Absence from regularly scheduled classes may seriously affect the student's academic standing. If a student is consistently absent without having made arrangements with the instructor, the instructor may take this to mean that the student has withdrawn and may issue a final grade of "W." Permission to make up work missed because of absence may be granted by the instructor on presentation of a reasonable excuse.

Auditing Policy

Students are permitted to audit courses upon submitting the usual registration forms and on paying the regular tuition fees. There is no reduction in fees for auditing. An auditor may participate in class discussion, complete papers and projects, and take tests and examinations for informal evaluation. However, regardless of the amount or quality of work completed, *academic credit will not be granted at any time for an audited course.*

The student's decision to audit a course must be communicated in writing to the Registrar's Office prior to the fourth class meeting. Exceptions to this procedure cannot be approved without authorization by the University College Academic Standing Committee.

Change of Address or Name

Change of address and/or name should be reported in writing both to the Registrar's Office, 120 Hayden Hall, Northeastern University, 360 Huntington Avenue, Boston, MA 02115, and to the Office of Academic and Student Affairs, 180 Ryder Hall. Legal documentation must accompany requests for name changes.

Class Changes

University College reserves the right to cancel, divide, or combine classes when necessary. Although this policy ensures that students in most cases will not be excluded from a class because it is oversubscribed, it also means that a course may be cancelled because of inadequate enrollment. Cancellations are more likely to occur among upper-level or advanced courses than among introductory courses. While students may register as late as the first week of class, cancellation decisions are based on pre-registration figures. *Students are therefore encouraged to register in advance to increase the likelihood that the courses they want will run.* Seniors who are adversely affected by course cancellations should contact an academic advisor or their program office for help in identifying alternatives.

Credit Hours: Quarter-Hour Credit

Credit hours are assigned to a course based on the established educational standard of one credit hour for every three hours of student learning time per week over a term. Thus one hour of lecture or discussion plus two hours of individual study outside of class equals one credit.

Northeastern University operates on a quarter-hour credit system. A quarter-hour credit is the equivalent of three quarters of a semester hour. Most University College courses are assigned three quarter hours (abbreviated "q.h.") of credit and meet for two hours and ten minutes each week.

Students who would like to take courses at Northeastern and then transfer these credits to another school are urged to receive permission from an advisor at the other school prior to registering, especially since many other schools operate on a semester calendar.

Examinations

Tests are scheduled throughout each quarter at the option of the instructor and are regarded as part of the term's coursework. A final examination is held at the end of each quarter in each course unless an announcement is made to the contrary. The procedure for making up final examinations missed due to student absence may be found on page 30.

Homework

The specific work required for each course in University College is determined by the instructor. In general, University College students are expected to spend an average of six to eight hours per week outside of class on assignments for each course. Students who are absent are responsible for obtaining their homework assignments from their instructors or from other students. Homework assignments are not available from the Office of Academic and Student Affairs.

International Students

Northeastern University is authorized under Federal law to enroll *non-immigrant alien* students. International Student Applications must be filed by all non-immigrant students. Because the process of applying to University College is complex, deadlines for completed applications are well in advance of the start of each term:

<i>Deadline</i>	<i>for Term Starting</i>
July 8, 1993	Sept. 1993 (Fall)
Oct. 8, 1993	Jan. 1994 (Winter)
Jan. 7, 1994	April 1994 (Spring)
April 8, 1994	June 1994 (Summer)

Students who miss the deadline for a given term will need to defer attendance to the following term. Proficiency in English is a prerequisite to admission and is determined by achieving a 550 on the TOEFL exam, by an assessment interview or by testing administered by the English Language Center. There is also an application fee of \$75.00.

Questions may be directed to the Office of Academic and Student Affairs, 180 Ryder Hall, 617-373-2400 (TTY 617-373-2825) or to the International Student Office, 270 Holmes Hall, 617-373-2310.

International students who are *resident aliens* in the U.S. must file an International Credentials Evaluation Form for admission and/or transfer credit and must provide proof of their resident alien status (green card). There is an evaluation fee of \$45.00. Questions may be directed to the Office of Academic and Student Affairs. (See page 26, Evaluation of International Educational Credentials, for further details.)

Course Load Policy

It is *recommended* that new students and/or students who are working full-time not take more than 12 quarter hours of credit per term. The *average* course load for a student working full-time is 6 q.h. per term. Students who are not working, or whose work schedules allow, may take up to 18 q.h. per term without special permission. Any student wishing to take more than 18 q.h. in a given term must file a course overload petition with the Office of Academic and Student Affairs *at least one week prior to the start of the term*. In no case may a student with a quality point average under 2.0 take more than 12 q.h. per term.

Petition for Course Overload forms are available from the Office of Academic and Student Affairs, 180 Ryder Hall, 617-373-2400 or TTY 617-373-2825.

Pass/Fail Courses

Students may register for one open *elective* course per quarter on a pass/fail basis and may not take more than a total of five pass/fail courses at University College. To be eligible for pass/fail status, the student must be in good academic standing (have at least a 2.0 quality-point average) and must also meet all prerequisites for the course.

To be graded on a pass/fail basis, the student must file a Pass/Fail Petition and have it signed by an academic advisor. Pass/Fail Petitions are available from the Office of Academic and Student Affairs, 180 Ryder Hall, 617-373-2400 or TTY 617-373-2825. Petitions must be *received prior to the fourth class meeting*. Exceptions to this procedure cannot be approved without authorization from the University College Academic Standing Committee. Please see also the section on Pass/Fail Grades, page 30.

Placement Tests

Placement tests are given to students enrolled in *Critical Writing 1* (ENG 4100), *Business Writing and Reports 1* (ENG 4380), and *Technical Writing 1* (TCC 4101) during the first class session. Some students may be requested to register for *Elements of Writing* (ENG 4011), a three-quarter-hour course offering additional help in writing, or *English for International Students* (ENG 4005, ENG 4006, or ENG 4007).

Students registering for *Contemporary Algebra 1* (MTH 4110) or *Contemporary Algebra 1 and 2 Combination* (MTH 4114) must take a placement test on the first night of class. The results will determine whether the student should take *Introduction to Mathematics 1 and 2* (MTH 4001 and MTH 4002) prior to taking *Contemporary Algebra 1*. Students registering for *College Algebra 1* (MTH 4107) must also take a placement test at the first class meeting. Some students may be asked to register for *Technical Mathematics* (MTH 4006) to help improve their math skills.

Prerequisites

Before registering for a course, students should read the course description in this *Bulletin* to determine if they need to have taken a prerequisite course. In order to ensure academic success, students are strongly advised to adhere to course prerequisites. Students with questions about prerequisites should contact the program office that administers the course or speak directly to the instructor.

Special Students

University College students who wish to take Basic College courses may, in certain instances, enroll on a term-by-term basis. These students must obtain prior approval from both the Office of the Dean of the college offering the course and University College's Office of Academic and Student Affairs, 180 Ryder Hall. Students must collect both signatures on a Special Registration Form and submit the form to the Registrar's Office. Tuition is charged at the Basic College rate.

Basic College students who wish to enroll in University College courses must obtain prior approval from the academic dean of their college.

Withdrawal Policy

Students who wish to withdraw from a course *must* complete a Course Drop Form, available at any campus location. Students who withdraw from a course prior to the end of the seventh week of a term (please refer to the specific deadline in each *Schedule Guide*) will have no record of the withdrawal on their transcripts. Students may withdraw from the beginning of the eighth week to the end of the week prior to final examinations but the withdrawal *will* be noted on their transcripts. No withdrawals will be allowed for any reason during the week in which final examinations are given.

Academic Integrity

Students must accept the responsibility to be honest and to respect ethical standards in meeting their academic assignments and requirements. Integrity in academic life requires that students demonstrate intellectual and academic achievement independent of all assistance except that authorized by the instructor. Consequently, *all* work submitted to meet course requirements, whether it takes the form of papers, examinations, laboratory reports, computer projects, quizzes, or any other work assigned, is expected to be the student's own work produced specifically for each course.

Students who fail to meet the responsibility of academic integrity as defined here are subject to disciplinary sanctions ranging from a reduction in grade or failure in the assignment or course to dismissal from the University. Details on the Code of Student conduct and complete disciplinary procedures are outlined in the University College *Student Handbook*.

Academic Monitoring

Student grades are monitored at least once each academic year, usually after the end of spring term. Nondegree students, undeclared majors, and unadmitted students whose quality-point averages fall below 2.0 are contacted by the Office of Academic and Student Affairs and are offered all possible assistance. These students may also be subject to academic review, probation, and dismissal from University College when such action is warranted.

Students who feel they would benefit from academic assistance are encouraged to work closely with an academic advisor. Students may make appointments by calling 617-373-2400 or TTY 617-373-2825.

Academic Standing Committee

The University College Academic Standing Committee convenes at least once each month, and more often if necessary, to consider student petitions and requests for exceptions to the academic policies and procedures contained in this *Bulletin*. The Committee has the power to dismiss students who do not meet the academic standards of University College. The Committee also serves as a hearing board for academic grievances, as outlined in the University College *Student Handbook*. Letters may be addressed to the Committee c/o Office of Academic and Student Affairs, 180 Ryder Hall.

Disciplinary Action

The University Court has the authority to warn, censure, suspend, expel, or remove from the list of degree candidates any student who, because of disruptive, threatening, or illegal conduct or poor character, is considered an unsuitable member of the College community. The University Court is convened to hear a case when a member of the University College community charges a student with a violation of the Code of Student Conduct. Complete procedures are contained in the University College *Student Handbook*, which can be obtained at all campus locations or by calling 617-373-2400 or TTY 617-373-2825.

Student Records

In accordance with the Family Educational Rights and Privacy Act of 1974, Northeastern University permits students to inspect their records whenever appropriate and to challenge specific parts of them when they feel it is necessary. Specific details of the law as it applies to Northeastern are available in the University College *Student Handbook*.

Students' Rights and Responsibilities

The University subscribes to the view that all students have certain rights and freedoms. For these reasons, the University has adopted and published specific policies and procedures governing student rights and freedoms, general conduct, student discipline, grievance procedures, disclosure of information from student records, and University judicial procedures. Judicial procedures are related to issues of discipline and conduct, the right of students to appeal judgments of their academic performance, grievances based on the fact that a student is handicapped, and allegations of sexual harassment. All policies and procedures governing the above matters may be found in the University College *Student Handbook*. Copies are available in the Office of Academic and Student Affairs or by calling 617-373-2400 or TTY 617-373-2825. In general, copies are also available at each campus location.

Degree Program Policies and Procedures

Applying for Admission to a Degree Program

A student who wishes to be admitted to University College as a degree candidate must follow either Option 1 or Option 2 procedures as outlined here.

Students are urged to apply for admission as soon as they are eligible. Students *must* be admitted to a degree program in order to be eligible for financial aid. The admission process must be completed before the start of the term for which financial aid is being applied. Non-immigrant international students must also be admitted to a degree program and must follow the procedures outlined on page 16, International Students. International students who are resident aliens must follow the procedures outlined on page 26, Evaluation of International Educational Credentials.

Option 1

In general, students who want to apply for admission to a degree program must have:

- completed at least eighteen quarter hours of credit, which may include transfer credit, and *must* include English courses ENG 4100, ENG 4111, and ENG 4112 or their equivalents;
- a minimum grade-point average of at least 2.0 (C) at University College (i.e. successfully completed at least one U.C. course); and
- a high school diploma or a high school equivalency certificate (GED).

In addition to the above requirements,

- Students who wish to apply to a Bachelor of Science in Business Administration (BSBA) degree program must also have completed 80 q.h. of credit, MTH 4110 and 4111 (Contemporary Algebra 1 and 2 or their equivalents), and one social science course.
- Students who wish to apply to the Bachelor of Science in Nursing (BSN) degree program should also note the additional admission requirements on page 117.

Students who meet these requirements may file an application for admission in the Office of Academic and Student Affairs or at any branch campus. Applications may also be submitted by mail. Call 617- 373-2400 or TTY 617-373-2825 to obtain an application. Students will be notified of their acceptance by mail.

Option 2

Students who must apply for admission but do not meet the above requirements should:

- arrange an admission interview with an academic advisor, by calling 617-373-2400 or TTY 617-373-2825, (617-367-6373 Downtown; 617-373-5544 Burlington; or 617-373-5544 other satellite locations);
- complete an Option 2 application for admission and bring it to the interview;
- bring an official copy of the high school transcript or GED certificate to the interview; and
- bring official copies of any college transcripts to the interview.

Interviews may be arranged at the Boston, Burlington, Dedham, Framingham, Liberty Square, Milford, and Weymouth campuses only.

Option 2 candidates interested in Bachelor of Science in Business Administration (BSBA) programs will be placed in Associate degree programs until they have met the Option 1 requirements for BSBA degrees.

Students who have been admitted to a degree program under Option 2 will have their transcripts reviewed after one academic year to ensure that they are making satisfactory academic progress. Satisfactory academic progress is defined as follows:

- completion of at least eighteen quarter hours of University College or transfer credit. This credit *must* include English courses ENG 4100, ENG 4111, ENG 4112, or their equivalents, and
- a minimum grade-point average of at least 2.0 (C) at University College.

The Office of Academic and Student Affairs will notify the Office of Financial Aid of those students who are not making satisfactory academic progress.

Academic Probation

All students are monitored at least once each academic year, usually after the end of spring term. Students majoring in Nursing are also reviewed on a quarterly basis by the Academic Standing Committee of the College of Nursing. Students in the Radiologic Technology Program are monitored on a continuing basis. Radiologic Technology students whose grades fall below acceptable levels are subject to sanctions imposed by the Program Director and may be asked to leave the program without a probationary period. Students who have been admitted to a degree program must maintain an overall quality-point average of not less than 2.0 (C) and a 2.0 (C) average in the required major courses in order to be considered in good academic standing. Any degree student whose overall quality-point average or major course average falls below 2.0 is placed on academic probation for a one-year period. Students receive formal notification of their probation and the level of performance required to return them to good academic standing. Students on probation are encouraged to meet with their assigned advisor at least once per term.

Students who do not raise their overall quality-point average or major concentration to 2.0 within the probationary period will have their cases referred to the University College Academic Standing Committee for review. This Committee has the power to remove students from their degree programs but allow them to continue taking courses at University College, or to dismiss them from University College. Students who have been dismissed from University College must petition the Academic Standing Committee no sooner than one year from the date of dismissal if they wish to return to University College.

Additional Degree Status

Any student who has received a bachelor's degree from University College and wishes to earn a second bachelor's degree must fulfill an additional 45 quarter hours in residence after full completion of the first degree, at least 12 quarter hours of which must be in the new major concentration.

A student who has already received an associate's or bachelor's degree from University College and who wishes to earn a second degree at the associate's level must fulfill an additional 24 quarter hours in residence after full completion of the first degree, at least 6 quarter hours of which must be in the new major concentration.

In either case, the additional degree and major must be distinctly different from the previously conferred degree. This policy does not apply to students earning an associate's degree who wish to go on for a bachelor's degree. Students interested in additional degree status are urged to first meet with an academic advisor.

Certificates Contained within Degrees

When a certificate is contained within a degree program (such as economics or graphic design), the grouping of certificate courses is treated like all other courses in terms of overall and major quality point average and the student receives a diploma only. However, if the student wishes to receive both a diploma and a certificate, the

higher standard for certificate courses (minimum 2.0 in each certificate course) will apply. Students must file a certificate completion petition separately in order to receive the certificate.

Change of Major

Students wishing to change majors within University College should file a Change of Major Petition with the Office of Academic and Student Affairs, 180 Ryder Hall. Petitions are available at all campus locations or by calling 617-373-2400 or TTY 617-373-2825. Students who have received an associate's degree who are now working toward a bachelor's degree should be sure to change their majors to their new programs.

Changes in Requirements

The continuing development of University College requires frequent revisions. When no undue and unusual hardship is imposed on students because of these changes, students are expected to meet the requirements of the most current *Bulletin*. If a particular student finds it impossible to meet those requirements, the *Bulletin* for the year in which he or she declared a major is binding. University College makes every effort to inform students who are admitted to a degree program of changes in the curriculum.

Academic programs, course content, and rules and regulations are subject to change without notice.

Course Substitutions

Students may request to replace a required course in an academic program with another comparable course. Although such requests are not encouraged, the University recognizes that students may occasionally have very good reasons for requesting such substitutions. Students must complete a Petition for Course Substitutions and submit it to the Office of Academic and Student Affairs. Petitions are available at each campus location or by calling 617-373-2400 or TTY 617-373-2825. Petitions are routinely forwarded to the appropriate program director. The program director reviews the request and notifies the student of the outcome. A copy of the completed request is kept in the student's file in the Office of Academic and Student Affairs.

Dean's List

All degree candidates who have taken a minimum of 18 quarter hours during the fall, winter, spring, and summer quarters, and who have completed this coursework with a quality-point average of 3.25 or better with no "I" grades, grades below C-, and no pass-fail grades (except where there is no alternative or where required by the program) are placed on the Dean's List. These students receive certificates of commendation from the Dean of University College after the summer quarter has ended. See page 32 for information on graduation with honor.

In Absentia Status

If a student moves beyond a reasonable commuting distance from University College or its branch campuses and has completed one hundred thirty-five or more quarter hours of credit (at least 75 q.h. of which must have been taken at University College), the Committee on Academic Standing will consider a petition to allow the student to complete his or her requirements for a University College degree at another approved college. The remaining courses must be completed within two years of the date of official *in absentia* status approval. The student must submit course descriptions to the Committee for approval prior to taking the courses.

Status Reports

The Office of Academic and Student Affairs provides status reports for students who want to know where they stand in a particular academic program. Status Report Request forms are available at all campus locations and by calling 617-373-2400 or TTY 617-373-2825.

No more than one status report for the same program will be issued to a student in a given academic year. Requests are processed on a rolling basis. Status reports are issued automatically

- when issuing the first transfer credit award; and
- when the student is changing majors.

Special Studies

Qualified students may have the opportunity to take up to **six** special studies. Those who meet the specifications described below **may take a combination of:**

- **two advanced tutorials**
- **one field work**
- **three independent studies or**
- **three honors programs.**

Petitions for these studies are available in the Program Offices, located on the second floor of Ryder Hall. Petitions should be filed at least six weeks prior to the quarter in which the special study is to be taken.

Most special studies are taken under the direction of a faculty advisor who will meet with the student at least three times during the quarter, and will be available for frequent phone conferences. The language and lab tutorials will meet weekly. Students may request a specific faculty member. However, no special study may proceed without the Program Director's approval.

Special studies are not offered in all subject areas. To find out if they are offered in your area of interest, check the course descriptions for your program in this *Bulletin*.

Before petitioning for a special study, you may wish to consult with your program office. In many cases, taking a full course will be of greater value to you.

Advanced Tutorial: The Advanced Tutorial is designed primarily for students with declared majors who have been unable to take a needed upper-level course in the usual format because the course has not been available for two consecutive years. The Advanced Tutorial is essentially a full course taken independently under the supervision of a faculty advisor who will provide a syllabus, test the student's progress, and ascribe a grade. With the exception of languages and a few labs, Advanced Tutorials are 3 q.h. credits each.

Students may take no more than two Advanced Tutorials and should have completed 87 q.h. before petitioning.

Field Work: Field Work courses are designed to enhance career development by allowing students to earn credit for the application of their academic studies to experiences in the work place. Field Work courses are offered for qualified Business students and certain Liberal Arts majors. Please refer to individual course descriptions for details, including prerequisites.

A student must have a 3.0 cumulative average to be eligible for field work and may take only one quarter of Field Work for 6 q.h. credits. Each student shall make his or her own arrangements for doing Field Work at an approved work site, and shall spend a minimum of fifteen hours per week at the site, whether on a paid or volunteer basis.

Each student shall meet with a departmental Field Work advisor at least five times per quarter in order to plan the project, monitor the student's progress, and present and discuss a final written report. The student's grade shall be dependent upon the quality of the experience as demonstrated by reports, work products, and other documentation and upon discussions between the University College faculty advisor and the work site supervisor.

Independent Study: The Independent Study is an opportunity for *degree students who have completed 96 q.h. and maintained a 3.0 q.p.a.* to undertake special research, reading, or experimental study projects in areas related to their major. In addition to filing a petition, interested students should submit a study proposal for the Program Director's approval. The proposal should include a detailed outline of the objectives and plan of study, and should be accompanied by a supporting statement from the faculty member under whose direction the study will take place. *Students may take up to three Independent Studies at 3 q.h. each.* Usually these courses would count toward major elective requirements.

Honors Program: The Honors Program is similar to the Independent Study, with two exceptions: the *student must have a 3.5 q.p.a.* to be eligible, and submit a more in-depth work product to earn the additional 1 q.h. credit.

Students may take up to three Honors Courses at 4 q.h. each. Usually these courses would count toward major elective requirements.

Please Note: *Students may not take more than three of either Independent Studies or Honors Programs.*

Transfer Credit Policies and Procedures

Transfer Credit Policy

Students may transfer credit from accredited institutions of higher education when courses completed are applicable to the student's program in University College. The minimum course grade acceptable for transfer credit is C, or 2.0 on a four-point scale. Regardless of the source (APL, CLEP, PEP, noncollegiate instruction, coursework at other schools), the total amount of transfer credit that may be awarded may not exceed 128 quarter hours. Courses for which transfer credit has been awarded may not be repeated at University College without a reduction in the transfer credit award. An accredited institution of higher education is an institution having recognition and membership in one of the six regional accrediting associations recognized by the Council on Post-Secondary Accreditation.

Transfer Credit Procedure

Students who would like to obtain an evaluation of credits earned from another institution must file a Transfer Credit Petition with the Office of Academic and Student Affairs. The student must then write to the registrar of the institution previously attended and request that an official transcript (one bearing that institution's seal) be forwarded to the Office of Academic and Student Affairs, University College, 180 Ryder Hall, Northeastern University, 360 Huntington Avenue, Boston, MA 02115.

Upon receipt of official transcripts, the Office of Academic and Student Affairs issues an evaluation of all credits as they apply to the student's program in University College. **Students should allow at least four weeks for processing transfer credit petitions from the point when all transcripts have been received.**

Since the process of evaluating transfer credit is complex, students should not expect evaluations of their transcripts during advising appointments. Official awarding of credit is recorded on the student's University College transcript when admission to a degree program is approved. Students who wish to be admitted to a degree program may indicate this on the transfer credit petition and should attach proof of high school graduation (official high school transcript, or notarized copy of diploma or GED certificate). Please see page 20 for admissions requirements.

Validation of Required Upper-Level Business Courses for Transfer Credit

It may be necessary for students entering the Bachelor of Science in Business Administration (BSBA) degree program to validate required upper-level business courses that they have taken outside the framework of the program.

The Bachelor of Science in Business Administration degree programs offered by University College conform to all standards established by the American Assembly of Collegiate Schools of Business (AACSB). AACSB has been recognized by the Council for Post-Secondary Accreditation and by the United States Office of Education as the sole accrediting organization for university bachelor's and master's degree programs in business administration.

Validation is the set of procedures that tests whether an upper-level course completed in the lower division of a bachelor's degree program should be accepted for transfer credit in the upper division of a bachelor's degree program recognized and approved by the AACSB.

In general, students are able to validate previously earned course credits by taking a sequential course, a department-approved examination, or a CLEP (College Level Examination Program) or PEP (Proficiency Examination Program) examination.

For more information on course validation, see page 69. Students should talk with a University College academic advisor for information about the validation of upper-level business courses for transfer credit.

Validation of Knowledge in Nursing

The College of Nursing endeavors to assess the clinical knowledge and skill of R.N. students in a variety of ways. Among these are standardized examinations developed by nationally recognized testing services. Upon successful completion of these examinations, R.N. students are eligible to register for clinical nursing courses in which the ability of the student to apply nursing knowledge in the clinical area is validated. When the student has demonstrated achievement of both theoretical and clinical knowledge in nursing through these mechanisms, academic credit will be awarded.

Evaluation of International Educational Credentials

United States citizens and international students with Resident Alien status who have international high school or college credentials must file an International Educational Credentials Form and pay a \$45.00 evaluation fee. An evaluation for purposes of admission and/or transfer credit is issued by the Office of Academic and Student Affairs. Requirements include completion of an interview and receipt of the completed form, official copies of all transcripts and translations into English and a check or bank draft for \$45.00 payable to Northeastern University. The official assessment of international educational credentials is made in accordance with current standards for awarding transfer credit at University College or as recommended by the Center for International Higher Education Documentation.

International students with non-immigrant status must file an International Student Application (see page 16, International Students) and will have any transfer credit evaluated as part of that process.

Course(s) at Another College or University

Students already enrolled at University College who want to complete one or more courses at another institution may file a Prior Approval for Transfer Credit form to ascertain whether the course they wish to take is acceptable and equivalent to the University College course. A course description should be attached to the petition. Students may take courses elsewhere without prior approval, but do so at their own risk, as the course may not transfer into University College. There is a total limit of 128 q.h. of transfer credit from all sources. Also, the residency requirement stipulates that students must take their *last* 24 q.h. for an A.S. or *last* 45 q.h. for the B.A., B.S. or B.S.B.A. degree at University College. (See page 32.)

Credit by Examination

University College awards credit by examination, provided the examination does not duplicate previously earned academic credit. Credit is granted for successful completion of examinations currently available through the College Level Examination Program (CLEP) of the College Entrance Examination Board and through the Proficiency Examination Program (PEP) of the American College Testing Program. Both programs have been designed to help students obtain college-level credit for knowledge acquired through nontraditional means, such as on-the-job training, educational television, or correspondence, extension, or independent study. The passing score for University College programs is 500 on general examinations and 50 on subject examinations. This score is established by University College and is independent of the College Board's recommendations. Information about these programs is available from the Office of Academic and Student Affairs at University College and from the Northeastern University Counseling Center.

Modern Language Proficiency Examination

Students may be eligible to receive a maximum of 12 q.h. of credit for proficiency in a modern language. Examinations are currently offered in French, Spanish, German, and Italian. Students should contact the Liberal Arts Program office, 617-373-2416, for more information or an application form.

Assessment of Prior Learning (APL)

University College students may obtain up to 18 q.h. of APL credit in specified academic disciplines for knowledge gained through prior learning experiences, whether work-related or personal.

Specifically, students may be eligible for APL credit if they have accrued a foundation of knowledge and skills equivalent to the content of courses in the following areas:

- liberal arts (ART, ASL, CMN, DRA, ECN, ENG, HST, JRN, MUS, PHL, POL, PSY, SOA, SOC, TCC);
- health professions and sciences (BIO, CHM, HMG, HRA, HSC, MLS, RAD, REC); and
- business (MIS, RE, and TRN *only*).

The primary method for documenting prior learning is through the assessment of a student portfolio, although in some instances an examination will also be required.

The student must submit an Application for Assessment of Prior Learning, along with a non-refundable \$75 application fee made payable to Northeastern University. The application fee covers assessment and processing costs and is not tied to the granting of credit. Applications are available at 180 Ryder Hall, at any satellite location, or by calling 617-373-2400 or TTY 617-373-2825. Applications should be returned to the Director of Academic and Student Affairs, 180 Ryder Hall.

The application portfolio should include a written narrative, accompanied by documentation, to support the claim for prior learning credit for one or more courses. Assistance in portfolio planning is available from academic advisors in the Office of Academic and Student Affairs. Appointments for this purpose can be made by calling 617-373-2400 or TTY 617-373-2825. In order to prepare documentation, students may want to request the *Guide to Portfolio Development for the APL Program* from the Office of Academic and Student Affairs and review course syllabi available from the appropriate Program Office. Documentation may include such evidence of accomplishment as published materials, writing samples, or copies of artistic works. Whenever possible, students should link prior learning to University College courses. However, when the appropriate course is critical to the academic soundness of a program, the student may be required to take the course, but may, in addition, receive APL credit as an elective credit in the related subject area.

Applications will be forwarded to the appropriate Program Office where faculty, consultants, and program office staff will review them. Students will be notified if further documentation or an examination is necessary. Decisions on the applications will be forwarded to the Director of Academic and Student Affairs. Please allow *at least six weeks* for processing. Students will be notified of the outcome. Any credit awarded will appear as transfer credit on the transcript.

Students will be permitted to enter the APL program only after all traditional sources of transfer credit have been fully utilized. Students will not receive credit for courses that normally would not transfer to University College. If a course has a CLEP, PEP, or challenge examination available, students will be required to take the exam. Credits earned through the APL program may be applied to certificate programs as transfer credit, within the limit designated for the certificate.

Students are encouraged to apply for APL credit as early as possible in their program. All previous college credits must be transferred and a status report completed by the Office of Academic and Student Affairs before an APL application can be submitted. All portfolio evaluations must be completed six months prior to graduation.

Any student wishing to pursue APL credit should contact an advisor in the Office of Academic and Student Affairs, 617-373-2400 or TTY 617-373-2825, to begin the application procedure.

Credit for Extra-Institutional Learning

Extra-institutional learning is learning that takes place outside the sponsorship of legally authorized and accredited post-secondary educational institutions. The term applies to learning acquired from formal courses sponsored by associations, governments, business, and industry.

In awarding credit for extra-institutional learning, University College uses the *National Guide to Educational Credit for Training Programs* published by the American Council on Education, and *College Credit Recommendations: The Directory of the National Program on NonCollegiate Sponsored Instruction*, published by the New York Board of Regents.

Students applying for credit for extra-institutional learning must submit a Transfer Credit Petition and provide official credentials from the sponsoring noneducational organization to the Office of Academic and Student Affairs. The credit may be applied toward degree requirements at University College if recommended in the *National Guide* or the *Directory*, provided credit is not otherwise obtainable through CLEP or PEP (see Credit by Examination page 26).

Grading System Policies and Procedures

Grading System

A student's work in each course is evaluated by the instructor, who awards a letter grade at the end of the quarter. This grade is officially recorded by the Registrar's Office. The grades and symbols used are given below, together with the numerical equivalents used for computing quality-point averages:

A	(4.000)	C	(2.000)	I	Incomplete
A-	(3.667)	C-	(1.667)	L	Audit (no credit)
B+	(3.333)	D+	(1.333)	S	Satisfactory (pass/fail grade)
B	(3.000)	D	(1.000)	U	Unsatisfactory (pass/fail grade)
B-	(2.667)	D-	(.667)	X	Incomplete (pass/fail grade)
C+	(2.333)	F	(0)	*	Grade not received

Change of Grade Policy

The period for clearing any grade (including "I" grades) is restricted to one calendar year from the end of the quarter in which the course was originally taken. "I" grades outstanding for twelve months or longer shall remain permanently on all records. Requests for exceptions to this policy must be made in writing to the University College Academic Standing Committee, 180 Ryder Hall.

Grade Reports and Transcripts

All efforts are made to mail grades prior to the beginning of the following quarter. A supplementary grade report is issued when a missing grade or a grade change is received. University regulations prohibit issuing grades by telephone. Grade reports of degree candidates indicate both their quarterly quality-point average and their cumulative quality-point average. Problems with grades not received (*) or grade changes that have not been posted on transcripts should be addressed to the Program Office that administers the course.

Students may obtain a transcript of their grades by making a request *in writing* to the Registrar's Office, 117 Hayden Hall, Northeastern University, Boston, MA 02115. Unofficial transcripts are issued free of charge when requested in person only. Official transcripts bearing the University seal cost \$2. Call (617) 373-2302 for further information.

Incomplete ("I") Grades

The "I" grade, or incomplete, may be given only when the student fails to complete a major requirement of a course, such as a term paper or a final exam, but has been in regular attendance. Students who have missed a substantial number of class meetings without the instructor's permission receive a grade of "W." An instructor may decide that a student has done so poorly in the course that even a perfect grade in a make-up final examination could not raise the grade from "F." In this case "F" is the proper grade, regardless of the missed final examination.

All deficiencies must be made up in the manner prescribed by the instructor no later than one year following the recording of the "I" grade. Students requesting an exception to this policy must petition the University College Academic Standing Committee in writing. To remove an "I" grade, the instructor must file a change of grade form with the program office. A student who elects to make up an "I" grade by taking the same course over again will be given a new grade and will be billed accordingly. The original "I" grade will remain on the student's record.

Missed Final Examinations

Students who miss a final examination are given a grade of "I" (incomplete) unless the student has done so poorly in the course that even a perfect grade on a make-up final could not raise the grade from "F," in which case an "F" shall be given as the proper grade. Students do not automatically have the right to make up a missed final examination. Students must petition for this privilege and pay a fee of \$50 for each make-up examination. Petitions are available at each campus location or by calling 617-373-2425. Students are notified whether or not their petitions have been approved prior to the date of the make-up examination.

Students who make up a missed final examination will have the appropriate letter or pass/fail grade substituted for the "I" grade on their transcripts. Please see previous section for more information about "I" grades.

Pass/Fail Grades

Satisfactory completion of work in all courses taken on a pass/fail basis is designated on the transcript by the letter "S." Unsatisfactory work is designated on the transcript by the letter "U." Any unsatisfactory grade must be handled according to the existing policy of University College but may never be cleared by enrolling in the same course on the basis of the pass/fail system of grading.

An incomplete in a course taken on a pass/fail basis is designated by the letter "X" on the transcript and is treated according to the normal procedure for grades of incomplete.

Please see also Pass/Fail Courses on page 17.

Quality-Point Average

To obtain the quality-point average, the numerical equivalent of each grade received is multiplied by the credit hours earned, the quality points are added together, and the total quality-points are divided by the student's total quarter hours. An example follows:

Grade Achieved	Numerical Equivalent	Credit Hours	Quality Points
A	4.000	3	12.0
B-	2.667	3	8.0
C	2.000	6	12.0
F	0.000	<u>3</u>	<u>0.0</u>
		(15)	(32.0) TOTALS

The quality-point average is equal to the total quality points (in this case, 32.0) divided by the total credit hours (15), which comes to an average of 2.13.

Pass/fail grades (S, U, and X), incompletes (I), and audits (L) are not included in the quality-point average. Similarly, transfer credits are not included in quality-point averages. However, the total earned hours appearing on the student's transcript include both transfer credits and "S" grades. Transfer credits only appear if a student has been formally admitted to a degree program.

A cumulative quality-point average below 2.0 is unacceptable and does not allow a student to continue in University College or to receive a degree from Northeastern University. The "F" grade is a failure and requires repetition of the course in its entirety. University College also has a requirement that the q.p.a. in the major concentration courses must be 2.0 or better.

Repeating a Course

“F” Grades

Students who receive an “F” in a required course must repeat the course at full tuition rate. The original course and grade will remain on the record, but “repeat” will be marked next to it and the new, not the old, grade will be computed into the q.p.a.

Improving Q.P.A.

Students may repeat any course to improve their grade. The original course and grade will remain on the record, but “repeat” will be marked next to it. In all cases it is the most recently received grade which will be counted in the q.p.a., whether it is higher or lower than the original grade. There is no reduction in tuition fees for repeated courses.

Duplication of Courses

Sometimes students inadvertently repeat a course. Students will not receive credit twice for the same course; therefore, students are advised to be careful when selecting courses, as course titles and/or numbers sometimes change. One way for students to insure that coursework will not be duplicated, particularly if courses were taken under the old numbering system, is by petitioning for an updated status report.

Graduation Policies and Procedures

Residence Requirement

Every candidate for the bachelor's or associate's degree must fulfill the minimum residence requirement, which is defined as the satisfactory completion of at least forty-five quarter hours of coursework for the bachelor's degree or twenty-four quarter hours of coursework for the associate's degree, in University College immediately preceding graduation. At least twelve of the forty-five quarter hours, or six of the twenty-four, must be in the candidate's major field of study.

Because of this residence requirement, students may not take courses at any other institution during their senior year for the purpose of transferring credit.

Students whose enrollment in a degree program is interrupted for a period of one year or more will be reinstated in that program or a comparable program at the time of re-entry into University College.

Graduation Requirements

Except for certain health professions programs, the requirement for graduation from University College is 174 quarter hours for a bachelor's degree and 96 quarter hours for an associate's degree, with attainment of an overall quality-point average of 2.0 (C). Students who have transferred in a substantial amount of elective credit may have more than 174 q.h. or 96 q.h. upon completion of their programs. In addition, the student must have a 2.0 average in the required major courses. Bachelor of Science in Business Administration degree candidates must also meet all validation requirements. Although the credits allowed for acceptable work completed elsewhere by transfer students count toward fulfillment of quantitative graduation requirements, neither the credits nor the grades earned in such courses are included in the quality-point computations for graduation. Course requirements for each degree are outlined in this *Bulletin*.

Graduation with Honor

Graduation with honor is reserved for bachelor's degree candidates who have completed a minimum of 72 quarter hours of work at University College and who have demonstrated distinctly superior academic achievement as evidenced by the following quality-point averages:

Graduation with Honor	3.25 to 3.49
Graduation with High Honor	3.50 to 3.74
Graduation with Highest Honor	3.75 to 4.00

Transfer credit is not considered in determining honors.

Credit by Examination During the Senior Year

CLEP or PEP examinations (see page 26) may be taken by students during their final year of study provided they have met the forty-five or twenty-four quarter-hour residence requirement for graduation described above. Because of the time it takes for CLEP and PEP examinations to be graded and returned to the University, students requesting June graduation must take their CLEP and PEP examinations no later than the winter quarter of their senior year, and students requesting September commencement must take their examinations no later than the spring term of their senior year.

Senior Status Procedure

Each student who intends to graduate in either an Associate's or a Bachelor's Degree program during the current academic year must notify the Office of Academic and Student Affairs of his or her intention to graduate by filing for a senior status report. Commencement is held twice a year, in June and September.

Senior status reports are issued to assist students with selecting the courses they need to complete their program requirements. Seniors are encouraged to request their senior status reports during the summer prior to the academic year in which they plan to graduate. Petition forms are available at each campus location or by calling 617-373-2400 or TTY 617-373-2825. At this time, seniors are also encouraged to clear up missing grades, incompletes, transfer credit, admissions, or other problems.

Once a Senior Status Report has been completed, the Office of Academic and Student Affairs mails a Commencement Data Card, which the student *must* return by the date specified on the card to be guaranteed inclusion on the official graduation list.

Academic Audit of Seniors

The Office of Academic and Student Affairs conducts an academic audit of all seniors approximately one month prior to graduation. During this audit, academic problems such as incompletes, missing grades, missing courses, or validation problems are noted. Every effort is made to relay this information to the student through mail and telephone contact. If these problems remain unresolved, seniors are notified by certified mail that they have failed to qualify for their degree.

Commencement Ceremony

Information concerning commencement is mailed to all seniors who have returned a Commencement Data Card (see Senior Status, above) during the spring term, for June graduation, or the summer term, for September graduation.

Attendance at Commencement for all University College degree candidates is optional. Students who do not attend Commencement should receive their diplomas by mail approximately six to eight weeks after the ceremony.

Students must have cleared all academic, financial, and/or disciplinary deficiencies in order to graduate. Students who have questions about the commencement ceremony should direct them to the Commencement Office, 617-373-3639.

Overview of Academic Programs

At University College, your options are almost unlimited. Our programs of study can take you in any direction you determine toward the fulfillment of your professional or personal objectives. You may enroll as a student pursuing a degree program or as a non-degree student taking a single course or a special program.

Our programs leading to the Bachelor of Science, Bachelor of Science in Business Administration, and Bachelor of Arts degrees provide opportunities for cultural and professional development equivalent in quality and scope to those offered in the conventional four-year college enrolling full-time students. The bachelor's degree requires 174 quarter hours of credit or more.

Programs leading to the Associate in Science degree enable students to establish a knowledge base in business administration, criminal justice and security, health professions and sciences, or liberal arts. The associate's degree requires 96 quarter hours of credit and is equivalent to the conventional two-year, or junior community college program in scope and quality. University College also offers certificate programs in a wide range of disciplines.

Degree and certificate programs are offered in the following areas. (The numbers indicate the page on which detailed curricula appear.)

Business Administration

Accounting

Associate in Science 71

Bachelor of Science in

Business Administration 81

Certificate 39

Advanced Accounting Certificate 57

Business Administration

Associate in Science 72

Certificate 41

Compensation and

Benefits Management

Certificate 42

Computer Programming and

Software Development

Certificate 43

Computer Programming and

Systems Analysis

Certificate 44

Computer Systems Specialist

Certificate 45

Corporate Travel Management

Certificate 46

Finance

Associate in Science 73

Bachelor of Science in

Business Administration 83

Certificate 47

Food Service Management

Certificate 48

National Institute for the

Food Industry Certification 61

Hotel and Restaurant Management

Associate in Science 74

Certificate 49

Human Resources Management

Associate in Science 75

Certificate 50

International Business

Advanced Certificate 58

Management

Bachelor of Science in

Business Administration 85

Certificate 51

Management Information Systems

Associate in Science 76

Bachelor of Science in

Business Administration 87

Marketing

Associate in Science 77

Bachelor of Science in

Business Administration 89

Certificate 51

Microcomputer Software

Certificate 52

Personal Financial Planning

Certificate 53

Preparation for National Certification
APICS 60
CTL 60
NAPM 61
National Institute for the Food Industry
Certification 61

Preparation for State Certification
Real Estate Salesperson's Exam
Preparation 61

**Purchasing and Materials
Management**
Associate in Science 78
APICS Examination Preparation 60
NAPM Examination Preparation 61
Certificate 54

Real Estate
Appraisal Registration Preparation 61
Salesperson's Examination
Preparation 61

Small Business Management
Certificate 54

**Transportation and Physical
Distribution Management**
Associate in Science 79
Certificate 55

UNIX for Business
Certificate 56

Technology

Operations Management
Associate in Science 91
Certificate 52

Operations Technology
Bachelor of Science 93

Criminal Justice and Security

Computer Crime and Security
Certificate 42

Corrections
Associate in Science 95
Bachelor of Science 96

Legal Studies
Certificate 50

Policing
Associate in Science 97
Bachelor of Science 98

Security
Associate in Science 99
Bachelor of Science 100

Health Professions and Sciences

Advanced Environmental Science
Certificate 58

Biological Science
Bachelor of Science 104

Biotechnology
Associate in Science 106
Bachelor of Science 107

Environmental Studies
Certificate 47

Health Information Administration
Bachelor of Science 109
Post Baccalaureate Certificate 110

Health Management
Bachelor of Science 111
Option in Continuing Care
Administration 112
Option in Community Health
Management 112
General Option 112

Health Science
Bachelor of Science 113

Human Development Services
Certificate with concentrations in:
Adolescent Care 49
Gerontology 49
Infant/Child Care 50

Medical Laboratory Science
Associate in Science 117
Phlebotomy Certification Preparation 61

Nursing
Bachelor of Science in Nursing
(in affiliation with the College of
Nursing) 119

Paramedic Technology
Associate in Science 120
EMT/Basic Program 60
Paramedic Technology Certificate 120

Radiologic Technology
Associate in Science 121

Liberal Arts

Acting

Certificate 39

Advertising

Certificate 40

American Sign Language and Deaf Studies

Certificate 40

American Sign Language-English Interpreting

Certificate 59

Arts and Sciences

Associate in Science 125

Business Communication

Certificate 41

Communication Studies

(formerly Speech Communication)

Certificate 42

Computer Graphic Design

Certificate 43

Economics

Bachelor of Arts 126

Bachelor of Science 126

Electronic Composition

Certificate 46

English

Bachelor of Arts 127

Bachelor of Science 128

Fine Arts

Bachelor of Arts 129

Bachelor of Science 129

Graphic Design and Visual Communication

Associate in Science 130

Bachelor of Science 131

Certificate 48

History

Bachelor of Arts 132

Bachelor of Science 133

Journalism

Advertising Certificate 40

Public Relations Certificate 53

Liberal Arts/Business Minor

Bachelor of Science 135

Liberal Studies

Bachelor of Arts 137

Political Science

Bachelor of Arts 139

Bachelor of Science 141

Psychology

Bachelor of Arts 143

Bachelor of Science 143

Public Relations

Certificate 53

Sociology-Anthropology

Bachelor of Arts 144

Bachelor of Science 144

Teacher Preparation Program for Elementary and Secondary Education 62-63

Technical Communications

Bachelor of Science 146

Technical Writing

Certificate 55

Writing

Certificate 56

Course descriptions are listed in alphabetical order by subject area beginning on page 150.

Certificate and Special Programs

Study Options with Proven Practical Dividends

While many students attend University College to obtain an Associate or Bachelor Degree, or to take specific courses, a growing number of adults have discovered the benefits of enrolling in one of University College's more than 50 certificate and special preparation programs. Each program offers a foundation of knowledge designed to provide the expertise needed for the attainment of specialized professional skills. (Please see the next page for a full listing.)

Since these popular programs were first offered in 1983, they have provided the following benefits:

- convey a cohesive base of job-related skills
- enhance career prospects within and outside the setting of one's employment
- offer marketable expertise to make career changes feasible
- prepare for licensing exams in selected specialized areas
- present "manageable" learning alternatives that may be completed within one or two years
- may be applied to degree programs at any time during or after certificate studies.

Easily Converted into Career Transition Programs

If you are thinking of making a career change in the near future, you might benefit from adding one or two of the following enhancements to your certificate studies:

- INT 4110 *Managing Career Decisions* (3 q.h.)
- INT 4112 *Career Action Planning* (1 q.h.)
- INT 4114 *Career Decision Making* (1 q.h.)
- Free job search seminars offered by the department of Career Services (call 617-373-2430 for times and places).

For example, you might take INT 4110, INT 4112, or INT 4114 as a first step to determine which career options are "right" for you. The Department of Career Services will offer a wide variety of job search seminars geared to assess your strengths, offer resume and interview strategies, and keep you updated on the changing marketplace. Combined with a certificate program these modest initiatives can take you a long way on the road to realizing your career dreams.

How to Proceed

Students entering a certificate program should file a certificate petition with the Office of Academic and Student Affairs. When you have completed all coursework toward your certificate, you should file a Certificate Completion Form. Petitions are available from the Office of Academic and Student Affairs, 180 Ryder Hall, 617-373-2400 or TTY 617-373-2825, and at all campus locations.

For assistance in determining course prerequisites or in deciding on the appropriate program, call 617-373-2400 or TTY 617-373-2825 for an appointment with an academic advisor, or call the number listed for each individual certificate program.

Most certificate programs are designed to facilitate transfer into a related degree program. In addition, a limited amount of transfer credit for introductory courses taken at another school may be applied toward certificate program requirements. The number of transfer credits permitted varies by certificate but is usually limited to 9 quarter hours.

Students who choose to complete a second certificate in a subject related to the first may find that the two have certain courses in common. However, a second certificate will not be awarded if more than 50 percent of the coursework is duplicated.

On occasion, students have good reasons for requesting permission to replace a required course with a substitute course. Permission to substitute a course must be granted by the appropriate program office. Students should submit a completed Petition for Course Substitutions to the appropriate office. Petitions are available at all campus locations.

Beginning with courses taken Fall term 1987, students must achieve a grade of C (2.0) or better in each course in order to receive a certificate.

Certificate Programs

- Accounting
- Acting
- Advanced Accounting*
- Advanced Environmental Science*
- Advertising
- American Sign Language and Deaf Studies
- ASL-English Interpreting*
- Business Administration
- Business Communication
- Communication Studies
- Compensation and Benefits Management
- NEW! Computer Crime and Security
- Computer Graphic Design
- NEW! Computer Programming and Software Development
- Computer Programming and Systems Analysis
- Computer Systems Specialist**
- NEW! Corporate Travel Management
- Electronic Composition
- Environmental Studies
- Finance
- Food Service Management
- Graphic Design and Visual Communication
- Health Information Administration Post-Baccalaureate *
- Hotel and Restaurant Management
- Human Development Services
- Human Resources Management
- NEW! International Business,* Advanced
- Legal Studies
- Management
- Marketing
- Microcomputer Software
- Operations Management
- Paramedic Technology**
- NEW! Personal Financial Planning
- Public Relations
- Purchasing and Materials Management
- Small Business Management
- Technical Writing
- Transportation and Physical Distribution Management
- UNIX for Business
- Writing

*These programs are at the intermediate or advanced levels. Check the program and course descriptions to determine your eligibility.

**Special application procedures necessary.

Special Programs

- APICS (Preparation for National Certification)
- CTL (Preparation for National Certification)
- EMT/BASIC
- NAPM (Preparation for National Certification)
- National Institute for the Food Industry Certification
- Phlebotomy Certification Preparation
- NEW! Real Estate Appraisal Registration Preparation
- Real Estate Salesperson's Exam Preparation
- Teacher Preparation Programs for Elementary and Secondary Education

Certificate Programs

Accounting Certificate Program



Designed to enable students to gain a foundation of knowledge in the accounting field, this program teaches how to compile, analyze, and prepare critical business and financial records.

	quarter hours
ACC 4101 ACC 4102 ACC 4103 Accounting Principles 1, 2, 3	9
ACC 4301 ACC 4302 ACC 4307 Intermediate Accounting 1, 2, 3	9
ACC 4310 Cost Accounting 1	3
FI 4301 Principles of Finance	3
Total Quarter Hours (Possible transfer credit: 9 quarter hours)	24
For more information, call 617-373-2418.	

Acting Certificate Program



Created to allow students to lay a foundation for further acting experience and career opportunities, this program encourages participation in a variety of drama courses.

	quarter hours
DRA 4101 Introduction to Theatre	3
DRA 4140 DRA 4141 Introduction to Acting 1, 2	6
DRA 4151 Acting for the Camera*	3
DRA 4152 Acting for Commercials*	3
DRA 4153 Acting for Voice Overs*	3
DRA 4250 Theatre Movement	3
DRA 4260 Theatre Speech	3
Total Quarter Hours (Possible transfer credit: 9 quarter hours)	24
For more information, call 617-373-2416 or 617-373-2423.	
*3 1/2-hour studio. Special fee, see page 259.	

Advanced Accounting Certificate Program



See page 57 for details.

Advanced Environmental Science Certificate Program



See page 58 for details.

Advanced International Business Certificate Program



See page 58 for details.

Advertising Certificate Program



Intended to build professional experience in fields such as copywriting, layout and design, and corporate advertising, this program stresses a combination of creative and hands-on practical skills.

		quarter hours
JRN 4112	Writing for Media 1	3
JRN 4349	Advertising Basics	3
JRN 4350	Advertising Copywriting	3
JRN 4351	Advertising Practice	3
ART 4115	Graphic Design for Non-Majors*	3
ART 4143	Advertising Design*	3
MTH 4520	Statistical Thinking	3
MKT 4301	Introduction to Marketing 1	3

Choose one elective from the following:

MKT 4302	Introduction to Marketing 2	(3)
MKT 4310	Advertising Management 1	(3)
JRN 4300	Photojournalism	(3)
ART 4160	Basic Photography*	(3)
MGT 4101	Introduction to Business and Management 1	(3)

Total Quarter Hours (Possible transfer credit: 9 quarter hours) **27**

For more information, call 617-373-2416 or 617-373-2423.

* 3 1/2-hour studio. Special fee, see page 259.

American Sign Language and Deaf Studies Certificate Program



Developed to introduce signing and give students the chance to practice and gain confidence in communicating with the hearing-impaired, this program allows students to explore the language and culture of the American deaf community. (For a more advanced program, please see ASL-English Interpreting Certificate, page 59.)

			quarter hours
ASL 4101	ASL 4102	American Sign Language 1, 2*	8
ASL 4201	ASL 4202	Intermediate American Sign Language 1, 2	8
ASL 4301	ASL 4302	Advanced American Sign Language Proficiency 1, 2	8
ASL 4412		American Deaf Culture	3
ASL 4410		Linguistics of American Sign Language	3
ASL 4411		Deaf History	(3)
or		or	
ASL 4413		Deaf Literature	(3)

Total Quarter Hours (Possible transfer credit for ASL 4101 and ASL 4102: 8 quarter hours; all other credits must be completed in residence; a 3.0 cumulative grade-point average is required to receive this certificate.) **33**

*An Advanced Placement examination is available for this course. If ASL 4101 or ASL 4102 is waived, a substitution must be made so that the quarter hours earned still total 33. If you enter the program beginning with ASL 2 (ASL 4102) as your first class (having tested out of ASL 1- ASL 4101), you will be required to take *both* Deaf History (ASL 4411) *and* Deaf Literature (ASL 4413) to meet all the credit requirements for the ASL and Deaf Studies Certificate.

For more information call Program Coordinator Nancy Becker, 617-373-2619 (TTY) or 1-800-439-2370 (New England Telephone Relay Service).

ASL-English Interpreting Certificate

See page 59 for details.



Business Administration Certificate Program



Intended to help students get started or catch up on the basics of business, this program is often taken as a foundation for further study of the various facets of business administration.

			quarter hours
ACC 4101	ACC 4102	Accounting Principles 1, 2	6
HRM 4301	HRM 4302	Organizational Behavior 1, 2	6
MKT 4301		Introduction to Marketing 1	3
MGT 4101	MGT 4102	Introduction to Business and Management 1, 2	6
<i>Choose one elective from the following:</i>			
MGT 4358		Today's Management Issues	(3)
		or	
MGT 4320		Managing Change	(3)
		or	
MGT 4323		Management and Leadership	(3)
Total Quarter Hours (Possible transfer credit: 9 quarter hours)			24
For more information, call 617-373-2418.			

Business Communication Certificate Program



Built around the premise that effective communication in a variety of business situations is a key factor in career satisfaction and advancement, this vital program sharpens verbal and writing skills for today's business world.

			quarter hours
CMN 4102		Group Discussion	3
CMN 4152		Interviewing	3
CMN 4153		Techniques of Persuasion	3
CMN 4154		Negotiation Skills	3
CMN 4155		Organizational Communication	3
CMN 4251		Business and Professional Speaking	3
JRN 4335		Public Relations Basics	(3)
or		or	
MKT 4335		Public Relations 1	(3)
MGT 4101		Introduction to Business and Management 1	3
<i>Choose one writing course from the following:</i>			
ENG 4380		Business Writing and Reports 1	(3)
JRN 4112		Writing for Media 1	(3)
TCC 4101		Technical Writing 1	(3)
<i>or choose any acceptable substitute in written communication, with prior approval of the department consultant or program director.</i>			
Total Quarter Hours (Possible transfer credit: 9 quarter hours)			27
For more information, call 617-373-2416 or 617-373-2423.			

Communication Studies Certificate Program (formerly Speech Communication Certificate)



Designed to offer students the opportunity to enhance their career prospects in all professional pursuits, this program concentrates on acquiring strong communication skills.

		quarter hours
CMN 4101	Fundamentals of Human Communication	3
CMN 4102	Group Discussion	3
CMN 4111	Voice and Articulation	3
CMN 4150	Self-Concept and Communication	3
CMN 4151	Listening	3
CMN 4152	Interviewing	3
CMN 4153	Techniques of Persuasion	3
CMN 4154	Negotiation Skills	3
CMN 4251	Business and Professional Speaking	3
Total Quarter Hours (Possible transfer credit: 9 quarter hours)		27
For more information, call 617-373-2416 or 617-373-2423.		

Compensation and Benefits Management Certificate Program



Created to offer students the opportunity to learn about the increasingly important and complex role of benefits management, this program focuses on today's business organizations.

		quarter hours
HRM 4310	Human Resources Management*	3
HRM 4309	Labor Relations*	3
HRM 4321	Wage and Salary Administration	3
HRM 4322	Employee Benefits*	3
HRM 4333	Employment Rights*	3
HRM 4334	Human Resource Information Systems	3
HRM 4342	Strategy Development in HRM	3
Human Resources Management (HRM) course of your choice		3
Total Quarter Hours (Possible transfer credit: 9 quarter hours)		24
For more information, call 617-373-2418.		

*This certificate may be taken by students who have also completed the Human Resources Management Certificate. Asterisked courses do not have to be repeated.

Computer Crime and Security Certificate



Intended to give the law enforcement and/or security professional expertise in the burgeoning field of computer crime and security. The coursework covers entry level familiarity with computers and computer systems all the way through criminal investigation procedures and pertinent case studies of computer crimes and investigations.

			quarter hours
CJ 4108	CJ 4109	Criminal Law and Procedure 1, 2	6
CJ 4201		Criminal Investigation 1	3
CJ 4411		Electronic Information Security	3
CJ 4412		Computer Crime and Security	3
CJ 4420		Advanced Computer Application in Criminal Justice	3
COM 4101		Introduction to Computer Literacy	4
MIS 4350		Auditing Data Processing	3
Total Quarter Hours (Possible transfer credit: 9 quarter hours)			25
For more information, call Dean Croatti at 617-373-3327.			

Computer Graphic Design Certificate Program



Designed to address the needs of both novice and professional designers seeking careers in the area of electronic graphic design, the core curriculum of this program is structured for students with little or no computer experience. Professional designers, subject to the approval of the Program Director, may substitute more advanced design or computer electives for up to three basic design courses. Some courses will be offered only on the Boston campus. Up to nine hours of APL (Assessment of Prior Learning) credit can be applied to the certificate as transfer credit.

Students must take all other required courses *before* taking ART 4186.

		quarter hours
ART 4135	Design Fundamentals*	3
ART 4139	Color Theory and Practice*	3
ART 4140	Graphic Communication and Production	3
ART 4141	Graphic Design 1*	3
ART 4151	Typography	3
ART 4181	Introduction to Computer Graphics*	3
ART 4183	Electronic Publishing Design*	3
ART 4184	Presentation Graphics*	3
ART 4185	Creative Imaging: Custom Computer Design*	3
ART 4187	Advanced Computer Illustration*	3
ART 4186	Computer Graphic Design Portfolio*	3
Total Quarter Hours (Possible transfer credit: 9 quarter hours)		33

For more information, call 617-373-2416 or 617-373-2423.

*3 1/2-hour studio. Special fee, see page 259.

Computer Programming and Software Development Certificate Program



Design your own MIS Certificate. In order to meet your needs with as much flexibility as possible, we leave the selection of courses up to you.

Choose five courses from among the following:

		quarter hours
MIS 4236	Advanced PC Software	(3)
MIS 4273	PC DOS	(3)
<i>or</i>	<i>or</i>	
MIS 4282	Operating Systems Overview	(3)
MIS 4283	Introduction to Windows Programming	(3)
MIS 4320	VAX Overview	(3)
MIS 4321	UNIX for C Programmers	(3)
MIS 4343	FoxPro DataBase	(3)
MIS 4342	Advanced Database	(3)

Choose three courses from among the following:

MIS 4221	COBOL Programming 1	(3)
MIS 4222	COBOL Programming 2	(3)
MIS 4235	Advanced COBOL Programming	(3)
MIS 4276	Programming in C1	(3)
MIS 4277	Programming in C2	(3)
MIS 4278	Programming in C3	(3)
MIS 4241	Programming in BASIC 1	(3)
MIS 4242	Programming in BASIC 2	(3)
MIS 4322	UNIX Shell Programming	(3)

Total Quarter Hours (Possible transfer credit: 9 quarter hours) **24**

For more information, call 617-373-2418.

Computer Programming and Systems Analysis Certificate Program



Built to help students keep up with new developments in this fast-paced field, this program enhances career prospects by providing a concrete knowledge-base in programming.

			quarter hours
MIS 4101	MIS 4102	Introduction to Data Processing and Information Systems 1, 2	6
MIS 4221	MIS 4222	COBOL Programming 1, 2	6
MIS 4236		Advanced PC Software	3
MIS 4276	MIS 4277	MIS 4278	Programming in C 1, 2, 3
MIS 4301			Structured Systems Analysis and Design 1
MIS 4302			Structured Systems Analysis and Design 2
Total Quarter Hours (Possible transfer credit: 9 quarter hours)			30

This certificate differs from the Computer Systems Specialist Program (described next) in that the courses for this certificate are regularly offered at all campuses and may be completed over a longer period of time than in the Specialist Program. For more information about both programs, call 617-373-2418.

Computer Systems Specialist Program



The Program

Designed to offer training to become computer systems specialists, this program is intended for students who are interested in entry-level programming positions in business and industry. The program addresses the career goals of individuals who have little or no academic or work-related background in computer programming. Students who successfully complete the program receive a Computer Systems Specialist Certificate.

Admission

Computer Systems Specialist Program candidates will be evaluated for acceptance into the program on the basis of their transcripts from high school or most recently attended college, their motivation and their expressed goals. Enrollment is limited. This program is offered only if a sufficient number of qualified candidates apply.

Time and Place

The program is scheduled to begin twice during the academic year, once in the fall and again in the spring quarter. Classes are scheduled for thirty-one weekends: Friday, 6 p.m. to 10 p.m., and all day Saturday, 9 a.m. to 5:30 p.m. Sections are offered at the Burlington campus.

Academic Credit and Certification

Upon satisfactory completion of the program, students will have accumulated forty-five quarter hours of academic credit, and will receive the program certificate. The credits represent 26 percent of the credits necessary for a bachelor's degree.

Placement Assistance

Although job placement is not guaranteed, most students who successfully complete the program find suitable employment. Placement services include individual counseling; job-search seminars on career opportunities, self-assessment, resume preparation, and interviewing skills; and resume referrals to employers.

For More Information

For more information about the program and an application form, contact the Business Administration Program Office, Northeastern University, University College, 360 Huntington Avenue, Boston, Massachusetts 02115, 617-373-2418.

Courses in the program are:

		quarter hours
MIS 4103	Introduction to Data Processing and Information Systems Intensive	6
MGT 4101	Introduction to Business and Management 1	3
MIS 4231	COBOL Programming Intensive	6
MIS 4236	Advanced PC Software	3
MIS 4279	Programming in C 1 and C 2 Intensive	6
MIS 4278	Programming in C 3	3
MIS 4282	Operating Systems Overview	3
MIS 4305	Structured Systems Analysis and Design Intensive	6
MIS 4307	Communications and Networking	3
MIS 4321	UNIX for C Programmers	3
MIS 4345*	Database Management Systems	3
Total Quarter Hours		45

*For course description see MIS 4445.

Corporate Travel Management



Prepares students for the many facets of corporate travel management, a growing sector of business.

Required:

TRN 4308
TRN 4309
TRN 4301
MGT 4101

Corporate Travel Management 1
Corporate Travel Management 2
Elements of Transportation 1
Introduction to Business and
Management 1

quarter hours

3
3
3
3

Choose 12 q.h. from the following:

TRN 4321
TRN 4303
TRN 4350
TRN 4340
TRN 4316
TRN 4701

Transportation Negotiation
Elements of Transportation 2
International Transportation
Air Transportation
Carrier Management
Independent Study in Travel
Management

(3)
(3)
(3)
(3)
(3)
(3)
(3)

TRN 4900

Field Work in Travel Management

(6)

Total Quarter Hours (Possible transfer credit: 9 quarter hours)

24-27

For more information, call 617-373-2418.

Electronic Composition Certificate Program



Designed to help students develop skills in starting up, advising, managing, and creating systems for the growing field of desktop publishing operations, this certificate program addresses a career that is "in demand."

ART 4135
ART 4139
ART 4140
ART 4141
ART 4151
ART 4181
ART 4183
ART 4184
ART 4366
ART 4410

Design Fundamentals*
Color Theory and Practice*
Graphic Communication and Production
Graphic Design 1*
Typography
Introduction to Computer Graphics*
Electronic Publishing Design*
Presentation Graphics*
Promotional and Technical Publications:
Design and Production*
Electronic Imaging Systems*

quarter hours

3
3
3
3
3
3
3
3
3
3

Total Quarter Hours (Possible transfer credit: 9 quarter hours)

30

For more information, call 617-373-2416 or 617-373-2423.

* 3 1/2-hour studio. Special fee, see page 259.

Environmental Studies



Developed for those concerned with the environment and those whose jobs deal directly with environmental issues, such as lawyers, journalists, and public relations professionals, this program addresses contemporary concerns. An extensive science background is *not* required.

			quarter hours
ESC 4103		Introduction to the Earth Sciences:	
		The Solid Earth	(3)
or		or	
ESC 4204		Physical Geology	(3)
ESC 4250		Conservation and the Nation	3
ESC 4251		Conservation and the Community	3
ESC 4252		Conservation Management	3
ESC 4220		Wetlands	3
BIO 4224	BIO 4225	BIO 4226	Ecology 1, 2, 3
			9
Total Quarter Hours			24
For more information, call Dr. Malcolm Hill at 617-373-4381.			

Finance Certificate Program



Intended to help students get the skills they need to assume more responsibility on the job, this program can help get you started on a finance career in banks, corporations, brokerage firms, schools, and government and social agencies, as well as help you advance to a management position.

			quarter hours
ACC 4101	ACC 4102	ACC 4103	Accounting Principles 1, 2, 3
FI 4301			Principles of Finance
FI 4302			Financial Management
FI 4310			Investment Principles
FI 4320			Credit Principles
FI 4325			Budgeting and Planning
Total Quarter Hours (Possible transfer credit: 9 quarter hours)			24
For more information, call 617-373-2418.			

Food Service Management Certificate Program



Designed for current and potential restaurant owners and managers, this program teaches students to run cost-effective operations that meet professional standards.

		quarter hours
HTL 4301	Introduction to Hotel and Restaurant Management	3
HTL 4307	Food Service Sanitation	3
HTL 4308	Food and Beverage Cost Control	3
HTL 4304	Hotel and Restaurant Law	(3)
or	or	
HTL 4309	Managerial Accounting for the Hospitality Industry	(3)
HTL 4320	Food Preparation (Intensive)*	6
HTL 4322	Consumer Food Preparation*	3
HTL 4324	Dining Room Beverage Operation and Preparation*	3
HTL 4331	Professional Chef's Training*	6
Total Quarter Hours (Possible transfer credit: 9 quarter hours)		30

*Special fee, see page 259.

For more information, call 617-373-2418.

Graphic Design and Visual Communication Certificate Program



Created to offer students a comprehensive background in graphic design and visual communication skills, this program is geared to individuals seeking entry into advertising, publishing, marketing, public relations, and media industries.

		quarter hours
ART 4135	Design Fundamentals*	3
ART 4139	Color Theory and Practice*	3
ART 4140	Graphic Communication and Production	3
ART 4141 ART 4142	Graphic Design 1*, 2*	6
ART 4143	Advertising Design*	3
ART 4151	Typography	3
ART 4181	Introduction to Computer Graphics*	3
ART 4367	Pictorial Imagery for the Graphic Designer*	3
ART 4251	Portfolio Development*	3

Total Quarter Hours (Possible transfer credit: 9 quarter hours; possible APL credit: 9 quarter hours. See p. 27)

30

For more information, call 617-373-2416 or 617-373-2423.

*3 1/2-hour studio. Special fee, see page 259.

Health Information Administration Post-Baccalaureate Certificate



See page 110 for details.

Hotel and Restaurant Management Certificate Program



Meant for those interested in developing a core of relevant management skills, this program is for those students particularly interested in entry into the people-centered hotel/restaurant field or for advancement in their present position.

		quarter hours
HTL 4301	Introduction to Hotel and Restaurant Management	3
HTL 4303	Front Office Management	3
HTL 4304	Hotel and Restaurant Law	3
HTL 4307	Food Service Sanitation	3
HTL 4308	Food and Beverage Cost Control	3
HTL 4309	Managerial Accounting for the Hospitality Industry	3
HTL 4313	Introduction to Tourism	3
HTL 4320	Food Preparation (Intensive)*	6
Total Quarter Hours (Possible transfer credit: 9 quarter hours)		27

*Special fee, see page 259.

For more information, call 617-373-2418.

Human Development Services Certificate



Designed for those who wish to acquire specialized skills to more effectively deal with a specific client group, this program enables the student to choose a specialized track appropriate for his/her personal and/or professional development.

Required		quarter hours
<i>Choose only one:</i>		
PSY 4240	Development: Infancy and Childhood	(3)
PSY 4241	Development: Adolescence	(3)
PSY 4242	Development: Adulthood and Aging	(3)
Required		
CMN 4150	Self-Concept and Communication	3
CMN 4225	Family Communication	3
CMN 4240	Managing Interpersonal Conflict	3
REC 4210	Psycho-social Aspects of Illness and Disability	3
REC 4378	Professional Caregiving 1	3
<i>Choose one of the following groupings:</i>		
Adolescent Care, Required†		
REC 4101	Therapeutic Recreation 1	3
REC 4215	Causes and Detection of Child Abuse	3
REC 4379	Professional Caregiving 2	3
SOC 4195	Drugs and Society	3
Gerontology, Required*		
HSC 4610	Geriatric Nutrition	3
PSY 4243	Aging and Mental Health	3
SOC 4225	Social Gerontology	3
SOC 4235	Death and Dying	3



Infant/Child Care, Required†

REC 4105	Childhood Medical Procedures	2
REC 4215	Causes and Detection of Child Abuse	3
REC 4300	Arts and Crafts**	3
REC 4379	Professional Caregiving 2	3

Total Quarter Hours (Possible transfer credit: 9 quarter hours) **29-30**

*For more information call 617-373-2416 or 373-2423.

**Special fee, see page 259.

†For more information call 617-373-3843.

Human Resources Management Certificate Program



Developed to enhance skills to handle the changing aspects of employer/employee relations, this certificate program addresses the current increasingly complex workplace.

			quarter hours
HRM 4301	HRM 4302	Organizational Behavior 1, 2	6
HRM 4310		Human Resources Management*	3
HRM 4309		Labor Relations*	3
HRM 4321		Wage and Salary Administration	3
HRM 4322		Employment Benefits*	3
HRM 4325		Training and Development	3
HRM 4333		Employment Rights*	3

Total Quarter Hours (Possible transfer credit: 9 quarter hours) **24**

For more information, call 617-373-2418.

*This certificate may be taken by students who have also completed the Compensation and Benefits Management Certificate program. Asterisked courses do not have to be repeated.

Legal Studies Certificate Program



Designed to give a background in the evolution and concepts of criminal law, this certificate program examines the fundamentals of trial procedures, the rules of evidence, and the history and development of the American Constitution.

			quarter hours
CJ 4101		Administration of Justice	3
CJ 4108	CJ 4109	Criminal Law and Procedure 1, 2	6
CJ 4110		Constitutional Law	3
CJ 4114	CJ 4115	Introduction to Law 1, 2	6
CJ 4118		Juvenile Law	3
CJ 4511		Survey of Criminal Evidence	3

Total Quarter Hours (Possible transfer credit: 6 quarter hours) **24**

Management Certificate Program



Developed to offer students the opportunity to earn skills in all areas of management, this program can be the key to career advancement in today's business world.

		quarter hours
HRM 4301	Organizational Behavior 1	3
MIS 4101	Introduction to Data Processing and Information Systems 1	3
MGT4101 MGT 4102	Introduction to Business and Management 1, 2	(6)
or	or	
MGT 4105	Introduction to Business and Management (Intensive)	(6)
MGT 4103	Introduction to Business and Management 3	3
MGT 4320	Managing Change	3
MGT 4329	Managing Small Businesses	3
<i>Choose one elective from the following:</i>		
MGT 4358	Today's Management Issues	(3)
or	or	
MGT 4323	Management and Leadership	(3)
Total Quarter Hours (Possible transfer credit: 9 quarter hours)		24
For more information, call 617-373-2418.		

Marketing Certificate Program



Created to help prepare students for a marketing career, this program reveals how to identify consumer needs, develop new products or services, determine prices, deal with customers, and design promotional strategies.

		quarter hours
MKT 4301	Introduction to Marketing 1	3
MKT 4302	Introduction to Marketing 2	3
MKT 4308	Direct Response Marketing	3
MKT 4310	Advertising Management 1	3
MKT 4315	Sales Management 1	3
MKT 4320	Marketing Management	3
HRM 4301 HRM 4302	Organizational Behavior 1, 2	6
Total Quarter Hours (Possible transfer credit: 9 quarter hours)		24
For more information, call 617-373-2418.		

Microcomputer Software Certificate Program



Designed for managers, administrators, and office support staff needing a comprehensive knowledge of microcomputer software. They may be looking forward to a promotion within their present organization or seeking employment. They recognize that mastery of the computer software area is needed by virtually every organization and that these skills will give them the competitive edge in securing a rewarding career in computer software.

			quarter hours
MIS 4101	MIS 4102	Introduction to Data Processing and Information Systems 1, 2	6
MIS 4236		Advanced PC Software	3
MIS 4276		Programming in C1	3
MIS 4277		Programming in C2	3
MIS 4282		Operating Systems Overview	(3)
or		or	
MIS 4273		PC DOS	(3)
MIS 4307		Communications and Networking	3
MIS 4342		Advanced DBase III	3
MIS 4343		FoxPro Database	3
MIS 4344		Business Presentation Graphics	3
Recommended:			
ART 4183		Electronic Publishing Design*	(3)

Total Quarter Hours (Possible transfer credit: 9 quarter hours) **30-33**
For more information, call 617-373-2418.
*3 1/2-hour studio. Special fee, see page 259.

Operations Management Certificate Program



Developed to examine how to help companies achieve higher profits, this program focuses on how to operate at maximum efficiency and lowest cost.

			quarter hours
OM 4301		Introduction to Operations Management	3
OM 4302		Operations Analysis	3
OM 4314		Productivity Enhancement and Quality Management	3
OM 4317		Purchasing and Materials Management	3
OM 4321		Operations Planning and Control	3
OM 4326		Operations Management Policy	3
MS 4332		Statistical Quality Control	3
PUR 4390		Just-In-Time Manufacturing (JIT)	3
OM 4910		Internship (optional)	(1)

Total Quarter Hours (Possible transfer credit: 9 quarter hours) **24-25**
For more information, call 617-373-2418.

Paramedic Technology Certificate Program



See page 120 for details.

Personal Financial Planning Certificate Program



Become your own "personal financial planner" through a study of the following courses:

			quarter hours
ACC 4101	ACC 4102	Accounting Principles 1, 2	6
ACC 4120		Essentials of Personal Income Taxation	3
FI 4101		Personal Finance	3
FI 4301		Principles of Finance 1	3
FI 4306		Personal Insurance Planning	3
RE 4301		Real Estate Fundamentals	3
Total Quarter Hours (Possible transfer credit: 9 quarter hours)			21

For more information, call 617-373-2418.

Public Relations Certificate Program



Designed to emphasize concepts and techniques of handling information, organizing activities and events, researching and communicating, and solving problems related to such groups as employees, stockholders, and consumers, this program can help students gain entry into the fast-paced "P.R." world.

			quarter hours
JRN 4112	JRN 4113	Writing for Media 1, 2	6
JRN 4335		Public Relations Basics	3
JRN 4336		Public Relations Practices	3
JRN 4337		Public Relations Problems	3
JRN 4480		Copyediting	3
MTH 4520		Statistical Thinking	3
CMN 4153		Techniques of Persuasion	3
<i>Choose one elective from the following:</i>			
JRN 4300		Photojournalism	(3)
MGT 4101		Introduction to Business and Management 1	(3)
MKT 4301		Introduction to Marketing 1	(3)
ART 4368		Graphic Design for Media	(3)
Total Quarter Hours (Possible transfer credit: 9 quarter hours)			27

For more information, call 617-373-2416 or 617-373-2423.

Purchasing and Materials Management Certificate Program



Created to help students improve on-the-job productivity and reduce inventory, this program centers on planning, acquisition, and conversion.

			quarter hours
ACC 4101	ACC 4102	Accounting Principles 1, 2	6
MGT 4101		Introduction to Business and Management 1	3
PUR 4351	PUR 4352	Purchasing 1, 2	6
PUR 4357		Business Negotiations	3
PUR 4358		Materials Requirement Planning	3
PUR 4365		Production Activity Control	3
PUR 4370		Inventory Management	3
PUR 4390		Just-in-Time Manufacturing (JIT)	(3)
or		or	
PUR 4395		Master Production Scheduling (MPS)	(3)
or		or	
PUR 4396		Systems and Technologies	(3)
Total Quarter Hours (Possible transfer credit: 9 quarter hours)			30
For more information, call 617-373-2418.			

Small Business Management Certificate Program



Developed as a thorough overview of small business operations, this program focuses on drawing up a comprehensive business plan, hiring employees, and keeping sound financial records.

			quarter hours
ACC 4101		Accounting Principles 1	3
MKT 4301		Introduction to Marketing 1	3
MKT 4310		Advertising Management 1	3
BL 4101		Business Law 1	3
HRM 4301		Organizational Behavior 1	3
MGT 4328		Creating New Ventures	3
MGT 4329		Managing Small Businesses	3
MGT 4340	MGT 4341	Small Business 1, 2	6
Total Quarter Hours (Possible transfer credit: 9 quarter hours)			27
For more information, call 617-373-2418.			

Technical Writing Certificate Program



Designed to help students acquire writing skills for a career in a technical field, this program can also sharpen skills for a variety of writing professions.

		quarter hours	
ART 4140		Graphic Communication and Production	3
MIS 4101	MIS 4102	Introduction to Data Processing and Information Systems 1, 2	6
TCC 4101	TCC 4102	Technical Writing 1, 2	6
TCC 4105		Editing for Science and Technology	3
TCC 4301	TCC 4302	Computer Software Technical Writing 1, 2	6
<i>Choose one computer language:</i>			
MIS 4221		COBOL Programming 1	(3)
or		or	
MIS 4241		Programming in BASIC 1	(3)
or		or	
MIS 4276		Programming in C1	(3)
Total Quarter Hours (Possible transfer credit: 9 quarter hours)			27
For more information, call 617-373-2416 or 617-373-2423.			

Transportation and Physical Distribution Management Certificate Program



Built to provide students with a comprehensive background in the overall operation of transportation firms, this program looks specifically at rate determination, warehousing, and regulation and deregulation.

		quarter hours	
TRN 4301	TRN 4303	Elements of Transportation 1, 2	6
TRN 4302	TRN 4304	Physical Distribution Management 1, 2	6
MGT 4101		Introduction to Business and Management 1	3
<i>Transportation electives</i>			9
Total Quarter Hours (Possible transfer credit: 9 quarter hours)			24
For more information, call 617-373-2418.			

ATTENTION: Transportation and Physical Distribution Management Students

Students may use their 9 elective credits for developing a career track in one of the following areas:

Carrier Management (Choose 3)

TRN 4316	Carrier Management
TRN 4334	Private Trucking
TRN 4340	Air Transportation
TRN 4341	Commuter Transportation
TRN 4350	International Transportation and Distribution Management

Logistics (Choose 3)

TRN 4305	Traffic Management 1: Rates and Tarriffs
TRN 4321	Transportation Negotiations
TRN 4325	Management of Warehouse Operations
TRN 4342	Transportation Loss, Damage and Other Claims
TRN 4350	International Transportation and Distribution Management

Transportation Policy (Choose 3)

TRN 4321	Transportation Negotiations
TRN 4350	International Transportation and Distribution Management
TRN 4341	Commuter Transportation
TRN 4701	Independent Study (Transportation Policy)

UNIX for Business Certificate Program



Designed to enable students to develop a working knowledge of UNIX principles and proficiency in "C" programming, this program places students on the cutting edge of technology.

			quarter hours	
MIS 4282		Operating Systems Overview	3	
MIS 4321		UNIX for C Programmers	3	
MIS 4322		Shell Programming	3	
MIS 4276	MIS 4277	MIS 4278	Programming in C1, C2, and C3	9
MIS 4307			Communications and Networking	3
MIS 4301	MIS 4302		Structured Systems Analysis and and Design 1, 2	6
Total Quarter Hours (Possible transfer credit: 9 quarter hours)				27

For more information, call 617-373-2418.

For more information, call 617-373-2418.

Writing Certificate Program



Created to allow students to investigate and practice different types of writing, this program can help develop the organizational and communication skills necessary for a variety of careers.

		quarter hours
ENG 4349	ENG 4350	Expository and Persuasive Writing 1, 2 6
ENG 4352		Expository Communications 3
JRN 4112	JRN 4113	Writing for Media 1, 2 6
TCC 4101		Technical Writing 1 3
ENG 4356		Creative Writing 3
ENG 4363		Writing for the Marketplace 3
JRN 4522		Magazine Writing (3)
or		or
JRN 4560		Developing Writing Style (3)
Total Quarter Hours (Possible transfer credit: 9 quarter hours)		27

For more information, call 617-373-2416 or 617-373-2423.

Intermediate and Advanced Certificate Programs

University College offers several certificate programs designed to meet the needs of students who have already completed a substantial body of college work. These programs all have specific prerequisites for entry and students should read the descriptive information provided to determine whether they are eligible.

Students wishing to enter one of these programs should file a petition with the Office of Academic and Student Affairs. **If documentation of transfer credit is important for establishing that prerequisites have been met, copies of college transcripts should be attached to the petition.** Petitions are available from the Office of Academic and Student Affairs, 180 Ryder Hall, 617-373-2400 or TTY 617-373-2825, and at all campus locations.

All certificate policies stated on pages 37-38 apply to Intermediate and Advanced Certificate Programs as well.

Advanced Accounting Certificate Program



Created for advanced students who have earned degrees already or who are majoring in areas other than accounting, this program can provide a second dimension or specialization in accounting for the management, finance, marketing or management information systems professionals.

This program is open only to students who have completed at least 80 quarter hours of college-level work. If you are new to University College, please attach proof that you have earned 80 q.h. to your "entering certificate petition." Students must meet the prerequisites for each course as outlined in the individual course descriptions. Students enrolled in the University College BSBA Accounting degree are *not* eligible to receive this certificate.

				quarter hours
ACC 4301	ACC 4302	ACC 4307	Intermediate Accounting 1, 2, 3	9
ACC 4408			Intermediate Accounting 4	3
ACC 4310			Cost Accounting 1	3
ACC 4411			Cost Accounting 2	3
ACC 4425	ACC 4426		Auditing 1, 2	6
ACC 4440	ACC 4441		Federal Income Taxes 1, 2	6
ACC 4400			Accounting Information Systems	3

Total Quarter Hours (Possible transfer credit: 9 quarter hours) **33**

Advanced Environmental Science Certificate Program



Intended for upper-level science and engineering students who wish to enter the environmental field, this advanced certificate program is also appropriate as a post-baccalaureate certificate for adults working in science and/or engineering. Interested students should have a knowledge of calculus, physics and chemistry.

Choose a minimum of 24 quarter hours of coursework from the following courses.

		quarter hours
BIO 4321	Soil Microbiology	3
CET 4350	Environmental Engineering 1*	4
ESC 4430	Soils and the Environment	3
ESC 4450	Introduction to Hydrology	3
ESC 4218	Groundwater	3
ESC 4219	Geochemistry of Groundwater	3
ESC 4220	Wetlands	3
ESC 4221	Environmental Geophysics	3
ESC 4222	Geology and Urban Planning	3
ESC 4435	Air Quality	3
MET 4370	Fluid Mechanics A*	4
MGT 4354	Management and the Environment	3

Total Quarter Hours 24

*These courses are offered through the School of Engineering Technology.

Advanced International Business Certificate Program



Designed for students who have already earned business degrees or who are upper-level students, this program provides a specialization in international business issues. *This program is open only to students who have completed at least 80 q.h. of college-level work and all course prerequisites.* If you are new to University College, please attach proof that you have earned 80 q.h. to your "entering certificate petition." Students must meet the prerequisites for each course as outlined in the individual course descriptions.

		quarter hours
BL 4316	International Law	3
FI 4450	International Finance	3
HRM 4347	Managing People in International Settings	3
MGT 4446	International Business Management and Operation	3
MGT 4357	Cultural Issues in International Business	3
MKT 4453	International Marketing	3
TRN 4350	International Transportation and Distribution Management	3
Foreign Language: Choice of 1) Spanish, 2) French, 3) Japanese, or 4) German*		8

Total Quarter Hours (Possible transfer credit: 9 quarter hours) 29

*Students may be eligible to receive a maximum of 8 q.h. of credit for proficiency in a modern language. Examinations are currently offered in French, Spanish, and German. Students should contact the Liberal Arts Program office, 617-373-2416, for more information or an application form.

American Sign Language-English Interpreting Certificate Program



The Program

Designed to offer students education and training as sign language interpreters, the American Sign Language-English Interpreting Certificate Program was developed for students already proficient in American Sign Language and English. The nine courses in the program cover the theory and practice of interpreting. Students who are looking for entry-level staff positions or freelance assignments may find this program helpful. Students preparing for state quality assurance screening and national evaluation may also benefit from this program.

To obtain the certificate, students must complete all required coursework, receive a grade of B or better in *ASL 4607 Interpreting Lab*, and maintain an overall average of 3.0 or better in the program.

Admission

Candidates for admission must have received a B or better in Advanced American Sign Language Proficiency 2 (ASL 4302), or have attained equivalent skills. Prospective students must complete an application process in which they demonstrate proficiency in English and American Sign Language as well as display an aptitude for tasks involved in the interpreting process. Previous experience in the deaf community is also highly recommended.

For More Information

For the introductory program (ASL/Deaf Studies Certificate), please see page 40. Applications and further information are available from the Program Coordinator Nancy Becker, 276 Holmes Hall, Northeastern University, 360 Huntington Avenue, Boston, Massachusetts 02115, 617-373-2619 (TTY) or 1-800-439-2370 (New England Telephone Relay Service).

				quarter hours
ASL 4600			Introduction to Interpreting	3
ASL 4601	ASL 4602	ASL 4603	American Sign Language-English Interpreting 1, 2, 3	12
ASL 4606			Interpreter Role and Ethics	3
ASL 4607			Interpreting Lab	4
ASL 4608			Practicum	4
ASL 4609			Contrastive Analysis for Interpreters	4
ASL 4610			Interpreters at Work	3
<i>Recommended: (not counted toward certificate)</i>				
ASL 4604	ASL 4605		Special Topics in Interpreting 1, 2	(6)

Total Quarter Hours (Possible transfer credit: 8 quarter hours) **33**

Advanced placement examinations are available for ASL 4202, ASL 4302, ASL 4412, and ASL 4410, which are prerequisites for courses for this certificate.

Health Information Administration Post-Baccalaureate Certificate Program



See page 110 for details.

Special Programs

APICS—Preparation for National Certification

The following courses are preparation for national exam certification leading to the title, Certified Production and Inventory Control Manager (CPIM).

		quarter hours
PUR 4358	Materials Requirements Planning	3
PUR 4365	Production Activity Control	3
PUR 4370	Inventory Management	3
PUR 4390	Just-In-Time Manufacturing	3
PUR 4395	Master Production Scheduling	3
PUR 4396	Systems and Technologies	3

Total Quarter Hours (Possible transfer credit: 9 quarter hours) **18**

Please call 617-373-2418 for information concerning the APICS certification examination.

CTL—Preparation for National Certification (Certified in Transportation and Logistics)

The American Society of Transportation and Logistics, Inc. has agreed to waive certain portions of their qualifying examination for the CTL through the successful completion of appropriate University College courses. Call (617) 373-2418 for further information.

Emergency Medical Technician / Basic



This course is designed for those who wish to become certified EMTs as well as for those who just want to be prepared for emergencies. Students who successfully complete the course receive nine quarter hours of credit, a Northeastern University certificate, and a CPR certification from the American Heart Association. They also become eligible to take the state EMT licensing examination.

The EMT/Basic course is offered at the Boston, Burlington, and Dedham campuses. Students spend 6 hours in class weekly for 12 weeks, attend 4 all-day Saturday exercises, and participate in 10 hours of in-hospital emergency room observation. There is a special tuition rate.

		quarter hours
EMS 4107	EMT/Basic	9

Total Quarter Hours **9**

For more information, call 617-272-5500.

For information on our Paramedic Technology Program, see page 120.

NAPM—Preparation for National Certification

The following courses prepare students to take the NAPM certification exams leading to Certified Purchasing Manager (C.P.M.). These courses may be applied toward the Purchasing and Materials Management Certificate and/or the associate's degree in Purchasing.

		quarter hours
PUR 4351	Purchasing 1	3
PUR 4352	Purchasing 2	3

For more information, call 617-373-2418.

National Institute for the Food Industry Certification

HTL 4307 Food Service Sanitation prepares students to receive the National Institute for the Food Industry Certification.

Phlebotomy Certification Preparation

This program is geared toward students who want to enter the health field as well as to currently practicing phlebotomists who want to be certified. These courses are designed to prepare students for the national certification examinations in phlebotomy.

		quarter hours
MLS 4104	Introduction to Phlebotomy *† (offered Winter and Summer Quarters)	4
MLS 4108	Phlebotomy Applied Study** (offered Fall and Spring Quarters)	2

Total Quarter Hours 6

*Pre-registration is recommended as this course frequently closes due to over-enrollment.

**Prerequisite MLS 4104, MLS 4108 is a 3 week full-time day practicum in an affiliated hospital.

†Special fee, see page 259.

Real Estate Appraisal Registration Preparation

The classroom hours in the following courses are recognized by the Massachusetts Board of Real Estate Appraisal Registration for the purposes of the new licensing and certification requirements.

			quarter hours
RE 4323	RE 4324	Real Estate Appraisal 1, 2	6
RE 4326		Appraising a Single Family Dwelling	3
RE 4327		Real Estate and Computer Analysis	3
RE 4328	RE 4329	Real Estate Financial Analysis 1, 2	6
RE 4340		Real Estate Development	3

For more information, call 617-373-2418.

Real Estate Salesperson's Exam Preparation

The following courses cover the basic principles and terminology of real estate, and the practices of real estate brokerage, including appraisal, finance, development, management, and investment. Upon successful completion of these courses, students may take the Massachusetts Real Estate Salesperson's Examination.

		quarter hours
RE 4301	Real Estate Fundamentals 1	3
RE 4302	Real Estate Fundamentals 2	3

For more information, call 617-373-2418.

Teacher Preparation Programs for Elementary and Secondary Education

You may qualify for University College's Elementary or Secondary Education Teacher Preparation Programs if you either are enrolled in a Bachelor's Degree program or have already earned a degree in the Liberal Arts and Sciences. An earned Bachelor's Degree including successful completion of this part-time undergraduate program leads to provisional (first stage) certification in Massachusetts as an Elementary school teacher or a teacher of English, History, Social Studies, Biology or General Science in grades 9 to 12. Full certification (second stage) requires a Master's Degree.

Admission Guidelines*

- Applicants must either be admitted to a *specified* degree program in University College and have completed three or more courses in a specified Arts and Sciences major *or* have completed a bachelor's degree program in an appropriate Liberal Arts and Sciences major (i.e. History) *and* have at least a 2.500 cumulative average.
- Before applying for this certification program, students should elect one introductory education course: *ED 4104 Introduction to Education*.
- Students must petition the Department of Education at Northeastern University for admission to this program. Petitions, available at UC's Office of Academic and Student Affairs, 180 Ryder Hall, must be accompanied by an official transcript and a letter of recommendation from an academic advisor, and be sent to Maurice Kaufman, Chairman, Department of Education, 57 Lake Hall. Petitions must indicate the year and quarter in which you plan to register for *ED 4817 Student Teaching Practicum*.

The Student Teaching Practicum (ED 4817):

- Student teaching is a 5-day per week commitment for one quarter. The Student Teaching Practicum is *not* offered during the summer quarter.
- To be eligible for the Student Teaching Practicum, students must have at least a 2.50 cumulative QPA, a grade of 2.000 or higher in all professional education courses, *and* must meet minimum academic requirements to remain in the liberal arts major.
- Students completing their bachelor's degree should plan to register for ED 4817 during the senior year (or equivalent) of their program.
- Students must meet with Dr. Kaufman at least one quarter prior to registering for ED 4817 to document that all requirements have been met and to discuss the details of the student teaching assignment. All student teaching placements and supervision assignments are arranged by the NU Department of Education. Students are notified in writing at least six weeks prior to student teaching and will receive a handbook of policies and procedures for student teachers.

*Northeastern's Department of Education will offer the Clinical Master's in 1994. For information call (617) 373-3302.

Elementary Education Teacher Preparation Program

		quarter hours
ED 4101	Introduction to Education	3
ED 4102	Child Development and Learning	(3)
or	or	
PSY 4240	Development: Infancy and Childhood	(3)
ED 4406	Elementary Curriculum I: language arts, art, music	3
ED 4407	Elementary Curriculum II: social studies	3
ED 4408	Elementary Curriculum III: science and mathematics	3
ED 4426	Fundamentals of Reading	3
CRS 4200	Introduction to Special Education	3
ED 4801	Field Experience I	1
ED 4802	Field Experience II	1
ED 4803	Field Experience III	1
ED 4817	Student Teaching Practicum	8
Total Quarter Hours		32

Secondary Education Teacher Preparation Program

		quarter hours
ED 4101	Introduction to Education	3
ED 4103	Adolescent Development and Learning	(3)
or	or	
PSY 4241	Development: Adolescence	(3)
ED 4410	General Teaching Methods for High School	3
ED 4411	Teaching in the High School (a) Mathematics (b) Science (c) English (d) Social Sciences	3
ED 4412	Curriculum Development in the High School	3
ED 4415	Reading/Learning Problems in Secondary School	3
CRS 4200	Introduction to Special Education	3
ED 4801	Field Experience I	1
ED 4802	Field Experience II	1
ED 4803	Field Experience III	1
ED 4817	Student Teaching Practicum	8
Total Quarter Hours		32

Business Administration Degree Programs

Martha P. Welch,
*Assistant Dean, Director,
Business Administration Programs*

Rose A. Doherty,
*Assistant Director,
Business Administration Programs*

270 Ryder Hall
617-373-2418

Program Consultants

ACC: Accounting

Consultant:

Professor Paul A. Janell (College of Business Administration) (617-373-4645)

Associate Consultant (Accounting Principles):

Dean Walter E. Kearney, Jr. (College of Business Administration) (617-373-2330)

BL: Business Law

Consultant:

Thomas J. Ahern, Esq. (617-426-4211)

FI: Finance

Consultant:

Dean Jonathan Welch (College of Business Administration) (617-373-5961)

Associate Consultant:

Joseph Stanford (617-383-9299)

Associate Consultant:

Robert T. Trimper (508-443-6518)

HRM: Human Resources Management

Consultant:

Professor Brendan Bannister (College of Business Administration) (617-373-2503)

Associate Consultant:

Kenneth C. Solano (617-373-5664)

HTL: Hotel and Restaurant Management

Consultant:

Donald A. Witkoski (508-362-2131, x361)

MGT: Management

Consultant:

Professor Daniel McCarthy (College of Business Administration) (617-373-3255)

Associate Consultants:

W. Arthur Gagne (508-263-5819)

Robert L. Goldberg (617-373-4737)

MIS: Management Information Systems

Consultant:

Professor Victor Godin (College of Business Administration) (617-373-4801)

Associate Consultant (Introduction):

Thomas M. Kelly (508-468-7900)

MIS: cont'd

Associate Consultant (Programming):

Edward Kaplan

(617-965-0277)

Associate Consultant (Systems):

Edward Sousa

(617-373-2415)

Associate Consultant (Computer Systems

Specialist Programs):

Alan M. Tattle (617-595-3696)

MKT: Marketing

Consultant:

Professor Dan T. Dunn, Jr. (College of Business Administration) (617-373-4563)

Associate Consultant:

Ronald J. McBrien (617-373-4745)

MS: Quality Control and Management Sciences

Consultant:

Professor Robert A. Parsons (College of Business Administration) (617-373-4749)

Associate Consultant:

William E. Grady (617-721-5770)

OM: Operations Management

Consultant:

Professor Robert A. Parsons (College of Business Administration) (617-373-4749)

Associate Consultant:

William E. Grady (617-721-5770)

PUR: Purchasing and Materials Management

Consultant:

Stephen F. Armstrong
(508-281-2000, x2519)

RE: Real Estate

Consultant:

Peter Flynn (617-233-2284)

TRN: Transportation and Physical Distribution Management

Consultant:

Professor James F. Molloy (College of Business Administration)
(617-373-4812)

A Wide Variety of Quality Programs: Preparing Students for the Challenge of Business

For generations, students in Northeastern University's part-time business programs have been successfully prepared to meet the challenges faced in the business professions. As the demands of the corporate world have changed, and the need for new skills has become evident, Northeastern has consistently demonstrated its ability to match course structure with the needs of men and women in business.

Today—perhaps more than ever—the professional competence ensured through the study of Northeastern's business programs is necessary for getting and keeping a position in the business world. Additionally, our business programs lay the foundation for long-range advancement.

Of greatest importance to your career is the quality of the program you choose to study. Northeastern's part-time bachelor's degree program in Business Administration is fully accredited by the American Assembly of Collegiate Schools of Business, the most prestigious accrediting organization of university business degrees in the United States. Our degree programs have been carefully structured to meet all the standards established by the AACSB.

University College's Bachelor of Science in Business Administration degree programs are described on page 67.

Certificates in Business

Individuals can pursue a certificate program to build on or prepare for a new career, to qualify for a promotion, to stay current in a chosen field, or simply to acquire new skills and knowledge. Some individuals enroll in a certificate program as part of their traditional degree program. University College offers certificates in the following business program areas:

Business Administration

- Accounting (page 39)
- Advanced Accounting (page 57)
- Business Administration (page 41)
- Compensation and Benefits Management (page 42)
- Computer Certificates
 - Computer Programming and Software Development (page 43)
 - Computer Programming and Systems Analysis (page 44)
 - Computer Systems Specialist Program (page 45)
 - Microcomputer Software (page 52)
- Corporate Travel Management (page 46)
- Finance (page 47)
- Food Service Management (page 48)
- Hotel and Restaurant Management (page 49)
- Human Resources Management (page 50)
- International Business, Advanced (page 58)
- Management (page 51)
- Marketing (page 51)
- Operations Management (page 52)
- Personal Financial Planning (page 53)
- Purchasing and Materials Management (page 54)
- Small Business (page 54)
- Transportation and Physical Distribution Management (page 55)
- UNIX for Business (page 56)

National Certification—CTL (Certified in Transportation and Logistics)

Students may waive portions of examinations through the study of appropriate University College courses. See page 60.

National Institute for the Food Industry Certification

HTL 4307 Food Service Sanitation provides an opportunity for certification from the National Institute for the Food Industry.

Preparation for National Certification—APICS and NAPM

Clusters of courses are being offered to prepare students for the national examinations leading to the titles of Certified Production and Inventory Control Manager (CPIM) and Certified Purchasing Manager (C.P.M.). See pages 60-61 for details.

Real Estate Appraisal Registration Preparation

Certain real estate courses are recognized by the Massachusetts Board of Real Estate Appraisal for the purposes of the new licensing and certification requirements. See page 61.

Real Estate Salesperson's Exam Preparation

Individuals interested in preparing for the Massachusetts Real Estate Salesperson's Examination may take the courses detailed on page 61.

Degree Programs

Associate in Science Degrees (AS)

Through a core of professional business courses and a well-balanced sequence of liberal arts courses, students in the Associate in Science degree programs acquire specialized knowledge for future managerial growth.

To receive the associate's degree, a student must successfully complete the 96 quarter hours of course credit specified for the degree. Students who have completed a certificate program may then enroll in an associate's degree program. (Although credits earned in a certificate program may be applied toward this degree, completion of a certificate program is not required).

Students who wish to earn one of the Associate in Science degrees in business and who have not earned 80 quarter hours of credit are required to enroll in the Open Business courses listed on pages 69-70.

The final examinations of certain open Business courses (see asterisked courses on pages 69-70) are used for course validation in the Bachelor of Science in Business Administration (BSBA) Degree programs. The students in these classes must earn a "C" or above in the final validating examination for the course to be accepted in the BSBA program. Please consult course instructor or call 617-373-2418 for further details.

Associate's degrees are offered in the following areas:

Business Administration

- Accounting (page 71)
- Business Administration (page 72)
- Finance (page 73)
- Hotel and Restaurant Management (page 74)
- Human Resources Management (page 75)
- Management Information Systems (page 76)
- Marketing (page 77)
- Purchasing and Materials Management (page 78)
- Transportation and Physical Distribution Management (page 79)

Bachelor of Science in Business Administration: BSBA Degree

University College offers a Bachelor of Science in Business Administration degree with concentrations in these areas:

- Accounting
- Finance
- Management
- Management Information Systems
- Marketing

The Bachelor of Science in Business Administration degree programs of University College are designed for men and women seeking to prepare themselves for managerial responsibility in business, government, and other organizations with the goal of developing the ability to recognize and solve problems and to understand the role of the business firm in the community, the nation, and the world. In developing these skills, students have the opportunity to gain not only a broad understanding of business and organizational problems through specialized courses, but also first-hand knowledge from effective full-time College of Business Administration professors as well as working professionals who are also teachers.

To ensure a well-rounded background that is so valuable in the business world, the college combines its business curriculum with courses from the sciences, humanities, and social sciences.

After the coursework foundation is completed, (See "Planning Your Program of Study Toward a Bachelor of Science in Business Administration Degree," below) the various functional areas of business are emphasized, and students concentrate their studies in specific areas. (Detailed descriptions of these areas follow this section.) In most of these upper-level courses, the traditional lecture-and-recitation format is supplemented by problem-solving and case-study methods where students analyze actual businesses and business problems and present recommendations for possible solutions.

Accreditation by the American Assembly of Collegiate Schools of Business

University College's Bachelor of Science in Business Administration Degree is fully accredited by the American Assembly of Collegiate Schools of Business, indicating that the programs meet the accrediting agency's standards for faculty and student quality, curriculum design and overall University support.

Planning Your Program of Study Toward a Bachelor of Science in Business Administration Degree

Students who plan to work toward the Bachelor of Science in Business Administration Degree should submit transcripts of previously completed college-level coursework and a Transfer Credit Petition to the Office of Academic and Student Affairs. (Transfer Credit Petitions may be requested by calling 617-373-2400 or TTY 617-373-2825. Petitions are also available at all campus locations.) Students will receive by mail a transfer credit evaluation and a suggested plan of study to prepare for admission to this program. When this paperwork has been completed, students are encouraged to schedule an appointment to discuss their programs with an academic advisor.

Students who do not have any academic courses that may be transferred from another educational institution or program should meet with an academic advisor early in their studies at University College. These students are required to complete 80 quarter hours of credit, including English courses ENG 4100, ENG 4111, and ENG 4112; mathematics courses MTH 4110 and MTH 4111; and a social science elective from the course list that follows. This coursework must be completed prior to admission to the BSBA degree program.

Once students have met these requirements, they should complete a Petition for Admission to the Bachelor of Science in Business Administration Degree program and return it to the Office of Academic and Student Affairs to initiate the admissions process. This petition may be obtained at all campus locations or by calling 617-373-2400 or TTY 617-373-2825.

Admission to the BSBA Degree program is restricted to students who have maintained a 2.0 cumulative grade-point average and completed a minimum of 80 quarter hours of credit.

Students should choose their 80 quarter hours of credit from the recommended lower-level course list that follows:

ACC 4101	ACC 4102	ACC 4103	Accounting Principles 1, 2, 3
BL 4101	BL 4102		Law 1, 2
CMN 4101			Fundamentals of Human Communication
ECN 4115	ECN 4116	ECN 4117	Economic Principles and Problems 1, 2, 3
ECN 4250	ECN 4251		Statistics 1, 2
ENG 4100			Critical Writing 1
ENG 4111	ENG 4112		Critical Writing 2, 3
ENG 4380	ENG 4381		Business Writing and Reports 1, 2
HST 4101			The Civilization of the Ancient and Medieval Worlds

One History course from the following:
(HST 4102, 4103, 4201, 4202, 4203, 4600 through 4646)

MGT 4101	MGT 4102	Introduction to Business and Management 1, 2
MIS 4101	MIS 4102	Introduction to Data Processing and Information Systems 1, 2
MS 4325		Business Decision Models
MTH 4110	MTH 4111	Contemporary Algebra 1, 2
PHL 4100		Philosophical Thinking
PSY 4110		Introduction to Psychology: Fundamental Issues
One Psychology elective (PSY)		
SOC 4100		Roles, Culture, and the Individual
SOC 4101		Inequality and Institutions
or		or
SOC 4102		Institutions and Social Change
3 quarter hours of a natural science elective (BIO, CHM or ESC)		
INT 4110 Managing Career Decisions—Strongly suggested elective		

Special Requirements for BSBA Degree Programs

The following procedures assure that University College's BSBA programs conform to AACSB standards:

1. Reserved and Open Courses

Business courses in the BSBA programs are classified as either *reserved* or *open*. Reserved courses are upper-level and are restricted to students who have enrolled in the BSBA degree program. To be qualified to register for a reserved course, the student must have earned a total of 80 or more credits (including transfer credits). Reserved courses are offered at the Boston, Burlington, Dedham, Framingham, Weymouth, and Liberty Square campuses. A student may register for an open course anytime, providing he or she has fulfilled the prerequisites. The final examinations of certain open Business courses (see asterisked courses on pages 69-70) are used for course validation in the Bachelor of Science in Business Administration (BSBA) Degree programs. The students in these classes must earn a "C" or above in the final validating examination for the course to be accepted in the BSBA program. Please consult course instructor or call 617-373-2418 for further details.

2. Validation

Validation is the term used to describe procedures that test whether an open course completed at the lower division of a bachelor's program should be accepted for transfer credit into the upper division of an AACSB-approved bachelor's degree program. There are three approved validation methods:

- **Sequential Course.** Students who enroll in a Bachelor of Science in Business Administration Degree program can validate a course taken at University College or elsewhere by successfully completing a course that is sequential to the course already completed. The sequential course must be taken in a reserved section. For example, successful completion of *Sales Management 2* in a reserved course can validate *Sales Management 1*, regardless of where the student completed *Sales Management 1*.
- **College-Level Examination Program (CLEP) and/or Proficiency Examination Program (PEP).** These standard examinations can be used to validate some previously taken upper-level business courses.
- **Departmental Examination.** In cases where a sequential course does not exist or is not desired by a student, and no appropriate CLEP or PEP examination exists, validation can be accomplished through a departmental examination.

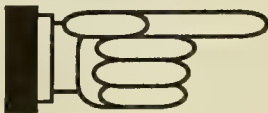
Required upper-level courses are listed as follows under Reserved and Open Sections.

OPEN BUSINESS COURSES

Open business courses are available on an open enrollment basis as long as the stated prerequisites are met and the student has earned under 80 quarter hours of credit.

ACC 4301	ACC 4302	ACC 4307	Intermediate Accounting 1, 2, 3
ACC 4310			Cost Accounting 1
FI 4301*			Principles of Finance
FI 4302*			Financial Management
FI 4310			Investment Principles
FI 4320			Credit Principles
FI 4325			Budgeting and Planning
HRM 4301*			Organizational Behavior 1

*The final examinations of these open business courses are used for course validation in the Bachelor of Science in Business Administration (BSBA) degree programs. The students in these classes must earn a "C" or above in the final validating examination for the course to be accepted in the BSBA program.



HRM 4302*
HRM 4310*
HRM 4304*

MIS 4301 MIS 4302
MIS 4305

MIS 4307
MKT 4301* MKT 4302*
MKT 4310
MKT 4315
MKT 4320*

Organizational Behavior 2
Human Resources Management
Organizational Behavior 1 and
Organizational Behavior 2 (Intensive)
Structured Systems Analysis and Design 1, 2
Structured Systems Analysis and
Design (Intensive)
Communications and Networking
Introduction to Marketing 1, 2
Advertising Management 1
Sales Management 1
Marketing Management

*The final examinations of these open business courses are used for course validation in the Bachelor of Science in Business Administration (BSBA) degree programs. The students in these classes must earn a "C" or above in the final validating examination for the course to be accepted in the BSBA program.

RESERVED BUSINESS COURSES

The courses below are offered for students in the Bachelor of Science degree programs and for those students who have earned 80 quarter hours of college credit. Please note appropriate course prerequisites.

ACC 4400		Accounting Information Systems
ACC 4408		Intermediate Accounting 4
ACC 4411		Cost Accounting 2
ACC 4425	ACC 4426	Auditing 1, 2
ACC 4440	ACC 4441	Federal Income Taxes 1, 2
FI 4403		Financial Strategy
FI 4411		Investment Management
FI 4421		Credit Management
FI 4426		Financial Control
FI 4450		International Finance
HRM 4415		Leadership
MGT 4410		Project Management Process: Planning and Implementation
MGT 4446		International Business
		Management and Operations
MGT 4450	MGT 4451	Business Policy 1, 2
MGT 4452		Business Policy (Intensive)
MGT 4455		Manager and Society
MIS 4445		Database Management Systems
MIS 4446		Information Systems for Management
MIS 4485		Applied MIS Development Project
MKT 4411		Advertising Management 2
MKT 4430	MKT 4431	Marketing Research 1, 2
MKT 4453		International Marketing
MKT 4457		Competitive Strategy
OM 4404		Service Operations Management

Special Studies

University College offers a variety of Special Studies. These courses give students an opportunity to earn credits in Advanced Tutorials, Independent Studies, and Honors Programs for Business. Consult course descriptions on pages 150-256.

Accounting Associate in Science Degree (Major Code 470)



See also: Accounting Bachelor of Science in Business Administration Degree, page 81.

Core Courses

Liberal Arts

	quarter hours
ENG 4100	Critical Writing 1 4
ENG 4111 ENG 4112	Critical Writing 2, 3 6
MTH 4110 MTH 4111	Contemporary Algebra 1, 2 6
ECN 4250 ECN 4251	Statistics 1, 2 6
ECN 4115 ECN 4116 ECN 4117	Economic Principles and Problems 1,2,3 9
PSY 4110	Introduction to Psychology: Fundamental Issues 3
One Psychology elective (PSY)	3

Business Administration

BL 4101 BL 4102	Law 1, 2 6
FI 4301	Principles of Finance 3
HRM 4301 HRM 4302	Organizational Behavior 1, 2 6
MGT 4101 MGT 4102	Introduction to Business and Management 1, 2 6
MIS 4101 MIS 4102	Introduction to Data Processing and Information Systems 1, 2 6

Major Concentration Courses

ACC 4101 ACC 4102 ACC 4103	Accounting Principles 1, 2, 3 9
ACC 4301 ACC 4302 ACC 4307	Intermediate Accounting 1, 2, 3 9
ACC 4310	Cost Accounting 1 3

Nonbusiness Electives	11
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Total Quarter Hours	96
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Business Administration Associate in Science Degree (Major Code 401)



See also: Management Bachelor of Science in Business Administration Degree, page 85.

Core Courses					quarter hours
Liberal Arts					
ENG 4100			Critical Writing 1		4
ENG 4111	ENG 4112		Critical Writing 2, 3		6
MTH 4110	MTH 4111		Contemporary Algebra 1, 2		6
ECN 4250	ECN 4251		Statistics 1, 2		6
ECN 4115	ECN 4116	ECN 4117	Economic Principles and Problems 1, 2, 3		9
PSY 4110			Introduction to Psychology: Fundamental Issues		3
One Psychology elective (PSY)					3
Business Administration					
ACC 4101	ACC 4102	ACC 4103	Accounting Principles 1, 2, 3		9
BL 4101	BL 4102		Business Law 1, 2		6
FI 4301			Principles of Finance		3
FI 4302			Financial Management		3
HRM 4301	HRM 4302		Organizational Behavior 1, 2		6
HRM 4310			Human Resources Management		3
MIS 4101	MIS 4102		Introduction to Data Processing and Information Systems 1, 2		6
MKT 4301			Introduction to Marketing 1		3
MGT 4101	MGT 4102	MGT 4103	Introduction to Business and Management 1, 2, 3		9
Nonbusiness Electives					11
Total Quarter Hours					96

Finance Associate in Science Degree (Major Code 476)



See also: Finance Bachelor of Science in Business Administration Degree, page 83.

Core Courses

Liberal Arts

	quarter hours
ENG 4100	Critical Writing 1 4
ENG 4111	Critical Writing 2, 3 6
MTH 4110	Contemporary Algebra 1, 2 6
ECN 4250	Statistics 1, 2 6
ECN 4115	Economic Principles and Problems 1, 2, 3 9
PSY 4110	Introduction to Psychology: Fundamental Issues 3
One Psychology elective (PSY)	3

Business Administration

ACC 4101	ACC 4102	ACC 4103	Accounting Principles 1, 2, 3 9
BL 4101	BL 4102		Law 1, 2 6
HRM 4301	HRM 4302		Organizational Behavior 1, 2 6
MGT 4101	MGT 4102		Introduction to Business and Management 1, 2 6
MIS 4101	MIS 4102		Introduction to Data Processing and Information Systems 1, 2 6

Choose one computer programming course from:

MIS 4221	COBOL Programming 1 (3)
or	or
MIS 4241	Programming in BASIC 1 (3)
or	or
MIS 4276	Programming in C1 (3)

Major Concentration Courses

FI 4301	Principles of Finance 3
FI 4302	Financial Management 3
FI 4310	Investment Principles 3
FI 4320	Credit Principles 3
FI 4325	Budgeting and Planning 3

Nonbusiness Electives 8

Total Quarter Hours 96

Hotel and Restaurant Management Associate in Science Degree (Major Code 472)



Core Courses

Liberal Arts

ENG 4100
ENG 4111 ENG 4112
MTH 4110 MTH 4111
CMN 4101

ECN 4115
PSY 4110

One Psychology elective (PSY)

Business Administration

ACC 4101
HRM 4301 HRM 4302
HRM 4310
MGT 4101 MGT 4102

MIS 4101

Major Concentration Courses

HTL 4301

HTL 4303
HTL 4304
HTL 4307
HTL 4308
HTL 4309

HTL 4313
HTL 4320
HTL 4322
HTL 4324

HTL 4331

Electives

Total Quarter Hours

quarter hours

Critical Writing 1 4
Critical Writing 2, 3 6
Contemporary Algebra 1, 2 6
Fundamentals of Human Communication 3
Economic Principles and Problems 1 3
Introduction to Psychology: Fundamental Issues 3
Accounting Principles 1 3
Organizational Behavior 1, 2 6
Human Resources Management 3
Introduction to Business and Management 1, 2 6
Introduction to Data Processing and Information Systems 1 3
Introduction to Hotel and Restaurant Management 3
Front Office Management 3
Hotel and Restaurant Law 3
Food Service Sanitation 3
Food and Beverage Cost Control 3
Managerial Accounting for the Hospitality Industry 3
Introduction to Tourism 3
Food Preparation (Intensive) 6
Consumer Food Preparation 3
Dining Room Beverage Operation and Preparation 3
Professional Chef's Training 6

Human Resources Management Associate in Science Degree (Major Code 477)



Core Courses

Liberal Arts

			quarter hours
ENG 4100		Critical Writing 1	4
ENG 4111	ENG 4112	Critical Writing 2, 3	6
MTH 4110	MTH 4111	Contemporary Algebra 1, 2	6
ECN 4250	ECN 4251	Statistics 1, 2	6
ECN 4115	ECN 4116	Economic Principles and Problems 1, 2, 3	9
PSY 4110	ECN 4117	Introduction to Psychology: Fundamental Issues	3
One Psychology elective (PSY)			3

Business Administration

ACC 4101	ACC 4102	Accounting Principles 1, 2	6
BL 4101		Law 1	3
MGT 4101	MGT 4102	Introduction to Business and Management 1, 2	6
MIS 4101	MIS 4102	Introduction to Data Processing and Information Systems 1, 2	6
MKT 4301		Introduction to Marketing 1	3

Choose one computer programming course from:

MIS 4221	COBOL Programming 1	(3)
<i>or</i>	<i>or</i>	
MIS 4241	Programming in BASIC 1	(3)
<i>or</i>	<i>or</i>	
MIS 4276	Programming in C1	(3)

Major Concentration Courses

HRM 4301	HRM 4302	Organizational Behavior 1, 2	6
HRM 4309		Labor Relations	3
HRM 4310		Human Resources Management	3
HRM 4321		Wage and Salary Administration	3
HRM 4322		Employee Benefits	3
HRM 4325		Training and Development	3
HRM 4333		Employment Rights	3

Nonbusiness Electives 8

Total Quarter Hours 96

Management Information Systems Associate in Science Degree (Major Code 475)



See also: Management Information Systems Bachelor of Science in Business Administration, page 87.

Core Courses

Liberal Arts

ENG 4100		
ENG 4111	ENG 4112	
MTH 4110	MTH 4111	
ECN 4250	ECN 4251	
ECN 4115	ECN 4116	ECN 4117
CMN 4101		

quarter hours

Critical Writing 1	4
Critical Writing 2, 3	6
Contemporary Algebra 1, 2	6
Statistics 1, 2	6
Economic Principles and Problems 1, 2, 3	9
Fundamentals of Human Communication	3

Business Administration

ACC 4101	ACC 4102
FI 4301	
HRM 4301	HRM 4302
MGT 4101	MGT 4102

MS 4325	
OM 4301 (formerly IM 4301)	
or	
OM 4404*	

Accounting Principles 1, 2	6
Principles of Finance	3
Organizational Behavior 1, 2	6
Introduction to Business and Management 1, 2	6
Business Decision Models	3
Introduction to Operations Management (3)	
or	
Service Quality Operations	(3)

Major Concentration Courses

MIS 4101	MIS 4102
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MIS 4221	MIS 4222
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or

MIS 4276	MIS 4277
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MIS 4236

MIS 4273

or

MIS 4282

MIS 4301	MIS 4302
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MIS 4307

Introduction to Data Processing and Information Systems 1, 2	6
COBOL Programming 1, 2	(6)
or	
Programming in C1, C2	(6)
Advanced PC Software	3
PC DOS	(3)
or	
Operating Systems Overview	(3)
Structured Systems Analysis and Design 1, 2	6
Communications and Networking	3

Electives

8

Total Quarter Hours

96

*See page 227 for prerequisites.

Marketing Associate in Science Degree (Major Code 479)



See also: Marketing Bachelor of Science in Business Administration Degree, page 89.

Core Courses

Liberal Arts

	quarter hours
ENG 4100	Critical Writing 1 4
ENG 4111	Critical Writing 2, 3 6
MTH 4110	Contemporary Algebra 1, 2 6
ECN 4250	Statistics 1, 2 6
ECN 4115	Economic Principles and Problems 1, 2, 3 9
ENG 4380	Business Writing and Reports 1 3
CMN 4101	Fundamentals of Human Communication 3

Business Administration

ACC 4101	ACC 4102	Accounting Principles 1, 2 6
FI 4301		Principles of Finance 3
FI 4302		Financial Management 3
HRM 4301	HRM 4302	Organizational Behavior 1, 2 6
MGT 4101	MGT 4102	Introduction to Business and Management 1, 2 6
MIS 4101	MIS 4102	Introduction to Data Processing and Information Systems 1, 2 6

Major Concentration Courses

MKT 4301	MKT 4302	Introduction to Marketing 1, 2 6
MKT 4308		Direct Response Marketing 3
MKT 4310		Advertising Management 1 3
MKT 4315		Sales Management 1 3
MKT 4320		Marketing Management 3

Nonbusiness Electives 11

Total Quarter Hours 96

Purchasing and Materials Management Associate in Science Degree (Major Code 431)



Core Courses

Liberal Arts

ENG 4100		
ENG 4111	ENG 4112	
MTH 4110	MTH 4111	
ECN 4250	ECN 4251	
ECN 4115	ECN 4116	ECN 4117

	quarter hours
Critical Writing 1	4
Critical Writing 2, 3	6
Contemporary Algebra 1, 2	6
Statistics 1, 2	6
Economic Principles and Problems 1, 2, 3	9

Business Administration

ACC 4101	ACC 4102
MGT 4101	MGT 4102

Accounting Principles 1, 2	6
Introduction to Business and Management 1, 2	6
Introduction to Data Processing and Information Systems 1, 2	6
Introduction to Marketing 1	3
Business Decision Models	3
Introduction to Operations Management	(3)
or	
Service Quality Management	(3)

MIS 4101	MIS 4102
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MKT 4301	
MS 4325	
OM 4301 (formerly IM 4301)	

or
OM 4404*

Major Concentration Courses

PUR 4351	PUR 4352
PUR 4357	
PUR 4358	
PUR 4365	
PUR 4370	
PUR 4390	

Purchasing 1, 2	6
Business Negotiations	3
Materials Requirements Planning	3
Production Activity Control	3
Inventory Management	3
Just-in-Time Manufacturing (JIT)	(3)
or	
Master Production Scheduling	(3)
or	
Systems and Technologies	(3)

or	
PUR 4395	
or	
PUR 4396	

Nonbusiness Electives

17

Total Quarter Hours

96

*See page 227 for prerequisites.

Transportation and Physical Distribution Management

Associate in Science Degree (Major Code 483)



Core Courses

Liberal Arts

			quarter hours
ENG 4100		Critical Writing 1	4
ENG 4111	ENG 4112	Critical Writing 2, 3	6
MTH 4110	MTH 4111	Contemporary Algebra 1, 2	6
ECN 4250	ECN 4251	Statistics 1, 2	6
ECN 4115	ECN 4116	Economic Principles and Problems 1, 2, 3	9
	ECN 4117		

Business Administration

ACC 4101	ACC 4102	Accounting Principles 1, 2	6
MGT 4101	MGT 4102	Introduction to Business and Management 1, 2	6
MKT 4301		Introduction to Marketing 1	3
MIS 4101	MIS 4102	Introduction to Data Processing and Information Systems 1, 2	6
MS 4325		Business Decision Models	3
OM 4301 (formerly IM 4301)		Introduction to Operations Management	(3)
or		or	
OM 4404*		Service Quality Management	(3)

Major Concentration Courses

TRN 4301	TRN 4303	Elements of Transportation 1, 2	6
TRN 4302	TRN 4304	Physical Distribution Management 1, 2	6
Transportation electives			9

Nonbusiness Electives 17

Total Quarter Hours 96

ATTENTION: Transportation and Physical Distribution Management Students

Students may use their 9 transportation elective credits for developing a career track in one of the following areas:

Carrier Management (Choose 3)

TRN 4316	Carrier Management
TRN 4334	Private Trucking
TRN 4340	Air Transportation
TRN 4341	Commuter Transportation
TRN 4350	International Transportation and Distribution Management

*See page 227 for prerequisites.



Logistics (Choose 3)

TRN 4305

TRN 4321

TRN 4325

TRN 4342

TRN 4350

Transportation Policy (Choose 3)

TRN 4321

TRN 4350

TRN 4341

TRN 4701

Traffic Management 1: Rates and Tarriffs

Transportation Negotiations

Management of Warehouse Operations

Transportation Loss, Damage and Other
Claims

International Transportation and
Distribution Management

Transportation Negotiations

International Transportation and
Distribution Management

Commuter Transportation

Independent Study (Transportation Policy)

Bachelor of Science in Business Administration Degrees

Accounting Bachelor of Science in Business Administration Degree (Major Code 460)



See also: Accounting Associate in Science Degree, page 71.

Liberal Arts			quarter hours	
ENG 4100			Critical Writing 1	4
ENG 4111	ENG 4112		Critical Writing 2, 3	6
ENG 4380	ENG 4381		Business Writing and Reports 1, 2	6
ECN 4115	ECN 4116	ECN 4117	Economic Principles and Problems 1, 2, 3	9
ECN 4250	ECN 4251		Statistics 1, 2	6
HST 4101			The Civilization of the Ancient and Medieval Worlds	3
One History course from the following:				
(HST 4102, 4103, 4201, 4202, 4203, 4600 through 4646)				3
MTH 4110	MTH 4111		Contemporary Algebra 1, 2	6
PHL 4100			Philosophical Thinking	3
PSY 4110			Introduction to Psychology: Fundamental Issues	3
One Psychology elective (PSY)				3
SOC 4100			Roles, Culture, and the Individual	3
SOC 4101			Inequality and Institutions	
or			or	
SOC 4102			Institutions and Social Change	3
CMN 4101			Fundamentals of Human Communication	3
Business Administration				
ACC 4101	ACC 4102	ACC 4103	Accounting Principles 1, 2, 3	9
BL 4101	BL 4102		Law 1, 2	6
FI 4301			Principles of Finance	3
FI 4302			Financial Management	3
HRM 4301	HRM 4302		Organizational Behavior 1, 2	6
MGT 4101	MGT 4102		Introduction to Business and Management 1, 2	6
MGT 4446			International Business Management and Operations	3
MIS 4101	MIS 4102		Introduction to Data Processing and Information Systems 1, 2	6
MKT 4301			Introduction to Marketing 1	3
MS 4325			Business Decision Models	3
OM 4404			Service Operations Management	3
MGT 4450	MGT 4451		Business Policy 1*, 2	6

*Students must complete 100 q.h. and all other Business Administration core courses before enrolling in Business Policy 1.



Choose one computer programming course from:

MIS 4221	COBOL Programming 1	(3)
or	or	
MIS 4241	Programming BASIC 1	(3)
or	or	
MIS 4276	Programming in C1	(3)

Major Concentration Courses

ACC 4301	ACC 4302	ACC 4307	Intermediate Accounting 1, 2, 3	9
ACC 4408			Intermediate Accounting 4	3
ACC 4310			Cost Accounting 1	3
ACC 4411			Cost Accounting 2	3
ACC 4425	ACC 4426		Auditing 1, 2	6
ACC 4440	ACC 4441		Federal Income Taxes 1, 2	6
ACC 4400			Accounting Information Systems	3

Electives

Natural science elective (BIO, CHM, or ESC)	3
Open electives	17

Total Quarter Hours	174
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Finance Bachelor of Science in Business Administration Degree (Major Code 433)



See also: Finance Associate in Science Degree, page 73.

Liberal Arts			quarter hours	
ENG 4100			Critical Writing 1	4
ENG 4111	ENG 4112		Critical Writing 2, 3	6
MTH 4110	MTH 4111		Contemporary Algebra 1, 2	6
ECN 4115	ECN 4116	ECN 4117	Economic Principles and Problems 1,2, 3	9
ECN 4250	ECN 4251		Statistics 1, 2	6
PSY 4110			Introduction to Psychology: Fundamental Issues	3
One Psychology elective (PSY)				3
ENG 4380	ENG 4381		Business Writing and Reports 1, 2	6
SOC 4100			Roles, Culture, and the Individual	3
SOC 4101			Inequality and Institutions	(3)
or			or	
SOC 4102			Institutions and Social Change	(3)
CMN 4101			Fundamentals of Human Communication	3
HST 4101			The Civilization of the Ancient and Medieval Worlds	3
One History course from the following:				
(HST 4102, 4103, 4201, 4202, 4203, 4600 through 4646)				3
PHL 4100			Philosophical Thinking	3
Business Administration				
ACC 4101	ACC 4102	ACC 4103	Accounting Principles 1, 2, 3	9
BL 4101	BL 4102		Law 1, 2	6
HRM 4301	HRM 4302		Organizational Behavior 1, 2	6
MGT 4101	MGT 4102		Introduction to Business and Management 1, 2	6
MGT 4446			International Business Management and Operations	3
MIS 4101	MIS 4102		Introduction to Data Processing and Information Systems 1, 2	6
MKT 4301			Introduction to Marketing 1	3
MS 4325			Business Decision Models	3
OM 4404			Service Operations Management	3
MGT 4450	MGT 4451		Business Policy 1*, 2	6
Choose one computer programming course from:				
MIS 4221			COBOL Programming 1	(3)
or			or	
MIS 4241			Programming in BASIC 1	(3)
or			or	
MIS 4276			Programming in C1	(3)

*Students must complete 100 q.h. and all other Business Administration core courses before enrolling in Business Policy 1.



Major Concentration Courses

FI 4301	Principles of Finance	3
FI 4302	Financial Management	3
FI 4403	Financial Strategy	3
FI 4310	Investment Principles	3
FI 4411	Investment Management	3
FI 4320	Credit Principles	3
FI 4421	Credit Management	3
FI 4325	Budgeting and Planning	3
FI 4426	Financial Control	3
FI 4450	International Finance	3

Electives

Natural science elective (BIO, CHM, or ESC)	3
Open electives	26

Total Quarter Hours **174**

Management Bachelor of Science in Business Administration Degree (Major Code 463)



See also: Business Administration Associate in Science Degree, page 72.

Liberal Arts			quarter hours	
ENG 4100		Critical Writing 1	4	
ENG 4111	ENG 4112	Critical Writing 2, 3	6	
ENG 4380	ENG 4381	Business Writing and Reports 1, 2	6	
ECN 4115	ECN 4116	ECN 4117	Economic Principles and Problems 1, 2, 3	9
ECN 4250	ECN 4251		Statistics 1, 2	6
HST 4101			The Civilization of the Ancient and Medieval Worlds	3
One History course from the following: (HST 4102, 4103, 4201, 4202, 4203, 4600 through 4646)				3
MTH 4110	MTH 4111		Contemporary Algebra 1, 2	6
PHL 4100			Philosophical Thinking	3
PSY 4110			Introduction to Psychology: Fundamental Issues	3
One Psychology elective (PSY)				3
SOC 4100			Roles, Culture, and the Individual	3
SOC 4101			Inequality and Institutions	(3)
or			or	
SOC 4102			Institutions and Social Change	(3)
CMN 4101			Fundamentals of Human Communication	3
Business Administration				
ACC 4101	ACC 4102	ACC 4103	Accounting Principles 1, 2, 3	9
BL 4101	BL 4102		Law 1, 2	6
FI 4301			Principles of Finance	3
FI 4302			Financial Management	3
HRM 4301	HRM 4302		Organizational Behavior 1, 2	6
HRM 4310			Human Resources Management	3
MGT 4101	MGT 4102	MGT 4103	Introduction to Business and Management 1, 2, 3	9
MIS 4101	MIS 4102		Introduction to Data Processing and Information Systems 1, 2	6
MIS 4236			Advanced PC Software	3
MKT 4301			Introduction to Marketing 1	3
MS 4325			Business Decision Models	3
OM 4404			Service Operations Management	3



Major Concentration Courses

HRM 4415	Leadership	3
MGT 4410	Project Management Process: Planning and Implementation	3
MGT 4446	International Business Management and Operations	3
MGT 4455	Manager and Society	3
MKT 4320	Marketing Management 1	3
MIS 4446	Information Systems for Management	3
MGT 4450	Business Policy 1*, 2	6
MGT 4451		

Electives

Natural science elective (BIO, CHM, or ESC)	3
Open electives	26
Nonbusiness elective	3

Total Quarter Hours **174**

*Students must complete 100 q.h. and all other Business Administration core courses before enrolling in Business Policy 1.

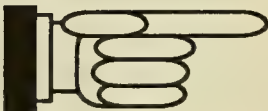
Management Information Systems Bachelor of Science in Business Administration Degree (Major Code 465)



See also: Management Information Systems Associate in Science Degree, page 76.

Liberal Arts			quarter hours	
ENG 4100			Critical Writing 1	4
ENG 4111	ENG 4112		Critical Writing 2, 3	6
ENG 4380	ENG 4381		Business Writing and Reports 1, 2	6
ECN 4115	ECN 4116	ECN 4117	Economic Principles and Problems 1, 2, 3	9
ECN4250	ECN4251		Statistics 1, 2	6
HST 4101			The Civilization of the Ancient and Medieval Worlds	3
One History course from the following:				
(HST 4102, 4103, 4201, 4202, 4203, 4600 through 4646)				3
MTH 4110	MTH 4111		Contemporary Algebra 1, 2	6
PHL 4100			Philosophical Thinking	3
PSY 4110			Introduction to Psychology: Fundamental Issues	3
One Psychology elective (PSY)				3
SOC 4100			Roles, Culture, and the Individual	3
SOC 4101			Inequality and Institutions	(3)
or			or	
SOC 4102			Institutions and Social Change	(3)
CMN 4101			Fundamentals of Human Communication	3
Business Administration				
ACC 4101	ACC 4102	ACC 4103	Accounting Principles 1, 2, 3	9
BL 4101	BL 4102		Law 1, 2	6
FI 4301			Principles of Finance	3
FI 4302			Financial Management	3
HRM 4301	HRM 4302		Organizational Behavior 1, 2	6
MGT 4101	MGT 4102		Introduction to Business and Management 1, 2	6
MGT 4446			International Business Management and Operations	3
MIS 4101	MIS 4102		Introduction to Data Processing and Information Systems 1, 2	6
MIS 4221	MIS 4222		COBOL Programming 1, 2	(6)
or			or	
MIS 4276	MIS 4277		Programming in C1, C2	(6)
MIS 4236			Advanced PC Software	3
MIS 4282			Operating Systems Overview	3
MKT 4301			Introduction to Marketing 1	3
MS 4325			Business Decision Models	3
OM 4404			Service Operations Management	3
MGT 4450	MGT 4451		Business Policy 1*, 2	6

*Students must complete 100 q.h. and all other Business Administration core courses before enrolling in Business Policy 1.



Major Concentration Courses

MGT 4410

MIS 4301

MIS 4302

MIS 4307

MIS 4445

MIS 4446

MIS 4485

Project Management Process:

Planning and Implementation 3

Structured Systems Analysis
and Design 1, 2 6

Communications and Networking 3

Database Management Systems 3

Information Systems for Management 3

Applied MIS Development Project 3

Electives

Natural science elective (BIO, CHM, or ESC) 3

Open electives 20

Total Quarter Hours**174**

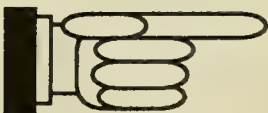
Marketing Bachelor of Science in Business Administration Degree (Major Code 461)



See also: Marketing Associate in Science degree, page 77.

Liberal Arts			quarter hours	
ENG 4100			Critical Writing 1	4
ENG 4111	ENG 4112		Critical Writing 2, 3	6
ENG 4380	ENG 4381		Business Writing and Reports 1, 2	6
ECN 4115	ECN 4116	ECN 4117	Economic Principles and Problems 1,2,3	9
ECN 4250	ECN 4251		Statistics 1, 2	6
HST 4101			The Civilization of the Ancient and Medieval Worlds	3
One History course from the following:				
(HST 4102, 4103, 4201, 4202, 4203, 4600 through 4646)				3
MTH 4110	MTH 4111		Contemporary Algebra 1, 2	6
PHL 4100			Philosophical Thinking	3
PSY 4110			Introduction to Psychology: Fundamental Issues	3
One Psychology elective (PSY)				3
SOC 4100			Roles, Culture, and the Individual	3
SOC 4101			Inequality and Institutions	(3)
or			or	
SOC 4102			Institutions and Social Change	(3)
CMN 4101			Fundamentals of Human Communication	3
Business Administration				
ACC 4101	ACC 4102	ACC 4103	Accounting Principles 1, 2, 3	9
BL 4101	BL 4102		Law 1, 2	6
FI 4301			Principles of Finance	3
FI 4302			Financial Management	3
HRM 4301	HRM 4302		Organizational Behavior 1, 2	6
MGT 4101	MGT 4102		Introduction to Business and Management 1, 2	6
MGT 4446			International Business Management and Operations	3
MIS 4101	MIS 4102		Introduction to Data Processing and Information Systems 1, 2	6
MS 4325			Business Decision Models	3
OM 4404			Service Operations Management	3
MGT 4450	MGT 4451		Business Policy 1*, 2	6

*Students must complete 100 q.h. and all other Business Administration core courses before enrolling in Business Policy 1.



Choose one computer programming course from:

MIS 4221	COBOL Programming 1	(3)
<i>or</i>	<i>or</i>	
MIS 4241	Programming in BASIC 1	(3)
<i>or</i>	<i>or</i>	
MIS 4276	Programming in C1	(3)

Major Concentration Courses

MKT 4301	Introduction to Marketing 1	3
MKT 4302	Introduction to Marketing 2	3
MKT 4310	Advertising Management 1	3
MKT 4411	Advertising Management 2	3
MKT 4315	Sales Management 1	3
MKT 4416	Sales Management 2	3
MKT 4320	Marketing Management	3
MKT 4430	Marketing Research 1	3
MKT 4431	Marketing Research 2	3
MKT 4453	International Marketing	3
MKT 4457	Competitive Strategy	3

Electives

Natural science elective (BIO, CHM, or ESC)	3
Open electives	20

Total Quarter Hours	174
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Technology Degree Programs

Martha P. Welch,
Assistant Dean, Director,
Technology Degree Programs

Rose A. Doherty,
Assistant Director,
Technology Degree Programs

270 Ryder Hall
617-373-2418

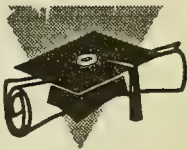
Program Consultants

Professor Robert A. Parsons
(College of Business Administration)
(617-373-4749)
Associate Consultant:
William E. Grady (617-721-5770)

University College offers a certificate, an associate's degree, and a bachelor's degree in Operations Technology.

To receive the associate's degree, a student must successfully complete the 96 quarter hours of course credit specified for the degree. Students who have completed the operations certificate program may then enroll in the associate's degree program. (Although credits earned in a certificate program may be applied toward this degree, completion of a certificate program is not required.)

Operations Management Associate in Science Degree (Major Code 491)



Core Courses

Liberal Arts

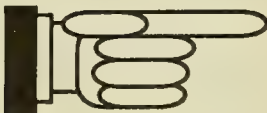
ENG 4100		
ENG 4111	ENG 4112	
MTH 4110	MTH 4111	
ECN 4115	ECN 4116	ECN 4117
ECN 4250	ECN 4251	
PSY 4110		

One Psychology elective (PSY)

Business Administration

ACC 4101	ACC 4102
MGT 4101	
MIS 4101	MIS 4102
MS 4325	

	quarter hours
Critical Writing 1	4
Critical Writing 2, 3	6
Contemporary Algebra 1, 2	6
Economic Principles and Problems 1, 2, 3	9
Statistics 1, 2	6
Introduction to Psychology: Fundamental Issues	3
	3
Accounting Principles 1, 2	6
Introduction to Business and Management 1	3
Introduction to Data Processing and Information Systems 1, 2	6
Business Decision Models	3



Choose one computer programming course from:

MIS 4221	COBOL Programming 1	(3)
<i>or</i>	<i>or</i>	
MIS 4241	Programming in BASIC 1	(3)
<i>or</i>	<i>or</i>	
MIS 4276	Programming in C1	(3)

Major Concentration Courses

OM 4301	Introduction to Operations Management	(3)
<i>or</i>	<i>or</i>	
OM 4404*	Service Operations Management	(3)
OM 4302	Operations Analysis	3
OM 4314	Productivity Enhancement and Quality Management	3
OM 4317	Purchasing and Materials Management	3
OM 4321	Operations Planning and Control	3
OM 4326	Operations Management Policy	3

Nonbusiness Electives 21

Total Quarter Hours 96

*Prerequisites: Must have 80 q.h. and MS 4325 to take this course.

Operations Technology Bachelor of Science Degree (BS)

A Bachelor of Science degree is offered in Operations Technology. The technology program is designed to prepare the student to meet the challenge of interfacing technology and society. The technology student not only learns related disciplines but also becomes oriented in disciplines to which his or her technological skills will be applied.

Graduates of science, engineering technology, liberal arts, or other selected programs in Northeastern University, community colleges, or other similar colleges and institutions who have an associate degree or its equivalent may transfer applicable credits toward the degree requirements of the baccalaureate program in operations technology. No more than 44 quarter hours of business administration credits may be applied toward the Bachelor's Degree in Operations Technology.

Operations Technology Bachelor of Science Degree (Major Code 492)



			quarter hours
Liberal Arts			
ENG 4100		Critical Writing 1	4
ENG 4111	ENG 4112	Critical Writing 2, 3	6
ECN 4115	ECN 4116	Economic Principles and Problems 1, 2, 3	9
	ECN 4117	Statistics 1, 2	6
ECN 4250	ECN 4251	Contemporary Algebra 1, 2	6
MTH 4110	MTH 4111	Introduction to Psychology: Fundamental Issues	3
PSY 4110			3
One Psychology elective (PSY)			
SOC 4100		Roles, Culture, and the Individual	3
SOC 4101		Inequality and Institutions	(3)
or		or	
SOC 4102		Institutions and Social Change	(3)
Business Administration			
ACC 4101	ACC 4102	Accounting Principles 1, 2	6
BL 4101	BL 4102	Law 1, 2	6
HRM 4301		Organizational Behavior 1	3
MGT 4101		Introduction to Business and Management 1	3
MIS 4101	MIS 4102	Introduction to Data Processing and Information Systems 1, 2	6
MS 4325		Business Decision Models	3
Major Concentration Courses*			
OM 4302		Operations Analysis	3
OM 4314		Productivity Enhancement and Quality Management	3
OM 4317		Purchasing and Materials Management	3
OM 4321		Operations Planning and Control	3
OM 4326		Operations Management Policy	3
OM 4404*		Service Operations Management	(3)
or		or	
OM 4301		Introduction to Operations Management	(3)
Nonbusiness electives (such as Science, Engineering Technology, Liberal Arts, or Criminal Justice)			86
Total Quarter Hours			174

*Prerequisite: 80 q.h. of credit.

Criminal Justice and Security Degree Programs

Dr. Paula M. Vosburgh, *Assistant Dean,
Acting Director, Criminal Justice and Security Programs*
266 Ryder Hall, 617-373-2818

Program Consultant

Robert Croatti
Associate Dean
College of Criminal Justice
617-373-3327

Purpose

Criminal Justice and Security programs are designed to provide a professional focus to students with a broadly based undergraduate education, to ensure that program graduates are prepared to enter or advance in careers in criminal justice or security administration or to enroll in graduate or professional schools.

The curriculum is built around a core of required courses after which the student selects a professionalization. A choice of upper-level coursework is offered.

Certificate Programs

Students who seek specialized background in criminal law may choose a certificate program in Legal Studies, which may be taken independently or in conjunction with degree study. Those studying for a degree, or Criminal Justice Professionals, will want to look into our *new* certificate in Computer Crime and Security. The certificate moves from entry-level familiarity with computers through pertinent criminal investigative procedures.

Associate in Science Degree Programs

Programs leading to the associate's degree are offered for those who wish to obtain a general background in corrections, policing, or security and who may later wish to pursue a bachelor's degree.

Candidates for the associate in science degree must complete a minimum of ninety-six quarter hours of credit. This is approximately one half of the requirements for the bachelor of science degree.

Bachelor of Science Degree Programs

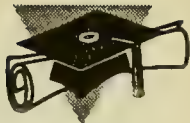
The Bachelor of Science degree is offered with specializations in corrections, policing, and security. Students should choose their specialization in consultation with a program advisor.

Each curriculum provides for not less than 174 quarter hours of work.

Course Sequence

Upon completion of the courses required for admission, the student should elect professional courses in their major as they appear on the schedule. Liberal Arts courses should be taken to complete the student's schedule.

Corrections Associate in Science Degree (Major Code 949)



Core Courses

COM 4101

ENG 4100

ENG 4111 ENG 4112

HST 4202

POL 4104

PSY 4110

SOC 4100

SOC 4186

CJ 4101

CJ 4103 CJ 4104

CJ 4108 CJ 4109

CJ 4110

CJ 4114 CJ 4115

Major Concentration Courses

CJ 4301

CJ 4302 CJ 4303

CJ 4304

CJ 4311

Electives

Criminal justice and security electives

Open electives

Total Quarter Hours

quarter hours

Fundamentals of

Computer Literacy 4

Critical Writing 1 4

Critical Writing 2, 3 6

American History 1848-1917 3

Introduction to American Government 3

Introduction to Psychology:

Fundamental Issues 3

Roles, Culture, and the Individual 3

Social Control 3

Administration of Criminal Justice 3

Criminology 1, 2 6

Criminal Law and Procedure 1, 2 6

Constitutional Law 3

Introduction to Law 1, 2 6

American Correctional System 3

Correctional Administration 1, 2 6

Jail Administration and Management 3

Probation and Parole 3

Corrections Bachelor of Science Degree (Major Code 948)



Core Courses			quarter hours	
COM 4101			Fundamentals of Computer Literacy	4
ENG 4100			Critical Writing 1	4
ENG 4111	ENG 4112		Critical Writing 2, 3	6
ECN 4115	ECN 4116	ECN 4117	Economic Principles and Problems 1, 2, 3	9
HST 4101			The Civilization of the Ancient and Medieval Worlds	3
HST 4103			The Civilization of the Modern World	3
HST 4202			American History 1848-1917	3
PHL 4100			Philosophical Thinking	(3)
or			or	
PHL 4200			Logic	(3)
POL 4103			Introduction to Politics	3
POL 4104			Introduction to American Government	3
PSY 4110			Introduction to Psychology: Fundamental Issues	3
PSY 4112			Introduction to Psychology: Personal Dynamics	3
SOC 4100			Roles, Culture and the Individual	3
SOC 4102			Institutions and Social Change	3
SOC 4186			Social Control	3
Mathematics/science courses				6
CJ 4101			Administration of Criminal Justice	3
CJ 4103	CJ 4104		Criminology 1, 2	6
CJ 4106			Criminal Justice Research	3
CJ 4107			Criminal Justice Statistics	3
CJ 4108	CJ 4109		Criminal Law and Procedure 1, 2	6
CJ 4110			Constitutional Law	3
CJ 4114	CJ 4115		Introduction to Law 1, 2	6
Major Concentration Courses				
CJ 4301			American Correctional System	3
CJ 4302	CJ 4303		Correctional Administration 1, 2	6
CJ 4304			Jail Administration and Management	3
CJ 4311			Probation and Parole	3
Electives				
Criminal justice and security electives				24
Open electives				43
Total Quarter Hours				174

Policing Associate in Science Degree (Major Code 947)



Core Courses

COM 4101

ENG 4100

ENG 4111 ENG 4112

HST 4202

POL 4104

PSY 4110

SOC 4100

SOC 4186

CJ 4101

CJ 4103 CJ 4104

CJ 4108 CJ 4109

CJ 4110

CJ 4114 CJ 4115

Major Concentration Courses

CJ 4201 CJ 4202

CJ 4207

CJ 4209 CJ 4210

Electives

Criminal justice and security electives

Open electives

Total Quarter Hours

quarter hours

Fundamentals of

Computer Literacy

4

Critical Writing 1

4

Critical Writing 2, 3

6

American History 1848-1917

3

Introduction to American Government

3

Introduction to Psychology:

Fundamental Issues

3

Roles, Culture, and the Individual

3

Social Control

3

Administration of Criminal Justice

3

Criminology 1, 2

6

Criminal Law and Procedure 1, 2

6

Constitutional Law

3

Introduction to Law 1, 2

6

Criminal Investigation 1, 2

6

Comparative Police Systems

3

Police Management 1, 2

6

6

22

96

Policing Bachelor of Science Degree (Major Code 946)



Core Courses

COM 4101

ENG 4100

ENG 4111

ENG 4112

ECN 4115

ECN 4116

ECN 4117

HST 4101

HST 4103

HST 4202

PHL 4100

or

PHL 4200

POL 4103

POL 4104

PSY 4110

PSY 4112

SOC 4100

SOC 4102

SOC 4186

Mathematics/science courses

CJ 4101

CJ 4103

CJ 4104

CJ 4106

CJ 4107

CJ 4108

CJ 4109

CJ 4110

CJ 4114

CJ 4115

Major Concentration Courses

CJ 4201

CJ 4202

CJ 4207

CJ 4209

CJ 4210

Electives

Criminal justice and security electives

Open electives

Total Quarter Hours

quarter hours

Fundamentals of

Computer Literacy

Critical Writing 1

Critical Writing 2, 3

Economic Principles and

Problems 1, 2, 3

The Civilization of the Ancient and

Medieval Worlds

The Civilization of the Modern World

American History 1848-1917

Philosophical Thinking

or

Logic

Introduction to Politics

Introduction to American Government

Introduction to Psychology:

Fundamental Issues

Introduction to Psychology:

Personal Dynamics

Roles, Culture, and the Individual

Institutions and Social Change

Social Control

Administration of Criminal Justice

Criminology 1, 2

Criminal Justice Research

Criminal Justice Statistics

Criminal Law and Procedure 1, 2

Constitutional Law

Introduction to Law 1, 2

Criminal Investigation 1, 2

Comparative Police Systems

Police Management 1, 2

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24

43

174

Security Associate in Science Degree (Major Code 943)



Core Courses

COM 4101

ENG 4100

ENG 4111 ENG 4112

HST 4202

POL 4104

PSY 4110

SOC 4100

SOC 4186

CJ 4101

CJ 4103 CJ 4104

CJ 4108 CJ 4109

CJ 4110

CJ 4114 CJ 4115

Major Concentration Courses

CJ 4403

CJ 4406 CJ 4407

CJ 4408

CJ 4411

Electives

Criminal justice and security electives

Open electives

Total Quarter Hours

quarter hours

Fundamentals of	
Computer Literacy	4
Critical Writing 1	4
Critical Writing 2, 3	6
American History 1848-1917	3
Introduction to American Government	3
Introduction to Psychology:	
Fundamental Issues	3
Roles, Culture, and the Individual	3
Social Control	3
Administration of Criminal Justice	3
Criminology 1, 2	6
Criminal Law and Procedure 1, 2	6
Constitutional Law	3
Introduction to Law 1, 2	6

Introduction to Security	3
Security Administration 1, 2	6
Legal Aspects of Security Management	
and Operations	3
Electronic Information Security	3

6
22

96

Security Bachelor of Science Degree (Major Code 942)



Core Courses

			quarter hours
COM 4101		Fundamentals of Computer Literacy	4
ENG 4100		Critical Writing 1	4
ENG 4111	ENG 4112	Critical Writing 2, 3	6
ECN 4115	ECN 4116	Economic Principles and Problems 1, 2, 3	9
	ECN 4117		
HST 4101		The Civilization of the Ancient and Medieval Worlds	3
HST 4103		The Civilization of the Modern World	3
HST 4202		American History 1848-1917	3
PHL 4100		Philosophical Thinking	(3)
or		or	
PHL 4200		Logic	(3)
POL 4103		Introduction to Politics	3
POL 4104		Introduction to American Government	3
PSY 4110		Introduction to Psychology: Fundamental Issues	3
PSY 4112		Introduction to Psychology: Personal Dynamics	3
SOC 4100		Roles, Culture, and the Individual	3
SOC 4102		Institutions and Social Change	3
SOC 4186		Social Control	3
Mathematics/science courses			6
CJ 4101		Administration of Criminal Justice	3
CJ 4103	CJ 4104	Criminology 1, 2	6
CJ 4106		Criminal Justice Research	3
CJ 4107		Criminal Justice Statistics	3
CJ 4108	CJ 4109	Criminal Law and Procedure 1, 2	6
CJ 4110		Constitutional Law	3
CJ 4114	CJ 4115	Introduction to Law 1, 2	6
Major Concentration Courses			
CJ 4403		Introduction to Security	3
CJ 4406	CJ 4407	Security Administration 1, 2	6
CJ 4408		Legal Aspects of Security Management and Operations	3
CJ 4411		Electronic Information Security	3
Electives			
Criminal justice and security electives			24
Open electives			43
Total Quarter Hours			174

Health Professions and Sciences Degree Programs

Dr. Paula M. Vosburgh, *Assistant Dean,
Director, Health Professions and Sciences
Programs*

266 Ryder Hall
617-373-2818

Program Directors and Coordinators

Area program directors and the Director of Health Professions and Sciences Programs have overall responsibility for the academic quality of the health programs in their areas of specialty. *The program coordinators for each area serve as the chief academic advisors for students in their programs.*

Health Professions

EMS: Paramedic Technology

Consultant: Glen Boden
(Bouvé College of Pharmacy and
Health Sciences) (617-373-2665)

HIA: Health Information Administration
(617-373-2818)

HMG: Health Management

Consultant: Joseph McNabb
(Labouré College) (617-296-8300, ext. 4022)

HSC: Health Science

Consultant: Nancy Warner
(Bouvé College of Pharmacy
and Health Sciences) (617-373-3320)

MLS: Medical Laboratory Science

Program Director:
Barbara Martin (Bouvé College of
Pharmacy and Health Sciences)
(617-373-3664)

NUR: Nursing

Professor Janet Carroll, R.N., M.S.N.
(College of Nursing)
(617-373-3129)

RAD: Radiologic Technology

Program Director:
Kevin J. Powers (University
College) (617-373-2818)
Assistant Director:
Valerie A. Lamb (University
College) (617-373-2818)

Sciences

BIO: Biology

Consultant: Dr. Fred A. Rosenberg
(College of Arts and Sciences) (617-373-4042)
Laboratory Coordinator:
Kevin Mautte (Biology Department)
(617-373-2260)

CHM: Chemistry

Consultant: Dr. Philip W. LeQuesne (College of
Arts and Sciences) (617-373-2867)
Assistant Coordinator: Jean Cathron (College of
Arts and Sciences) (617-373-2824)
Laboratory Coordinator: Bernard Lemire (College
of Arts and Sciences) (617-373-2811)

Biotechnology

Consultant: Dr. John Monahan
(CIBA Corning Diagnostics)
(508-660-2066, between
7:00-9:00 p.m.)

ESC: Earth Science

Consultant: Dr. Malcolm Hill
(College of Arts and Sciences)
(617-373-4381)

MTH: Mathematics

Consultant: Francis X. Finigan
(Educational Consultant)
(617-484-8496)

Purpose

University College offers part-time and full-time programs in allied health to prepare students for advancement and service in hospitals and other health agencies.

The associate's and bachelor's degree programs are designed to provide both professional specialization and general education. Programs meet the accreditation standards of the Committee on Allied Health Education and Accreditation (CAHEA) of the American Medical Association (AMA) and/or of licensing or registration boards, where such exist.

Clinical Assignments

Clinical assignments are generally available for students whose programs require applied study in a clinical setting. Clinical practice is conducted at hospitals or other health agencies in the Greater Boston area. Positions in applied clinical studies are often offered on first-come, first-served basis. Arrangements should be made with the program's clinical coordinator as much in advance as possible.

Most clinicals require liability insurance and a health clearance. Students should check with the clinical coordinator of the program for exact details.

Students who accept clinical assignments in health facilities are expected to adhere to the requirements of the facilities, which are outside University control.

Special Studies and Certificates

University College offers a variety of Special Studies. These courses give students an opportunity to earn credits in Advanced Tutorials, Independent Studies, Honors Programs, and Field Work. Consult descriptions on pages 23-24. Students should be aware that special criteria exist for certain courses and the course description should be consulted.

Students can choose a certificate program to learn new skills or enhance skills they already have. If the student wishes to continue, many certificates are transferable into related degree programs. Health and Science certificates are listed below:

Advanced Environmental Sciences	(page 58)
Environmental Studies	(page 47)
Health Information Administration Post Baccalaureate	(page 110)
Human Development Services:	
Specialties in: Adolescent Care, Gerontology, and	
Infant/Child Care	(page 49-50)
Paramedic Technology	(page 120)
Phlebotomy Professional Preparation	(page 61)

Preprofessional Medical Courses

The following information is provided for students who plan to apply for admission to schools of medicine, osteopathy, dentistry, podiatry, or optometry. Those who wish to pursue veterinary medicine may need to meet different entrance requirements and should consult the chair of the Health Professions Advisory Committee for additional advice. Information Sessions are scheduled a number of times during the year. Members of the Health Professions Advisory Committee and others will be there to review the application procedure and answer questions. Call 617-373-2818 for a schedule of the Information Sessions and to reserve a place.

Medical School Admission Requirements

Northeastern University's Health Professions Advisory Committee provides academic advice and help with health professional school applications for students in any of the University's programs. Although advice is available to anyone enrolled in a course, the Committee can prepare evaluation letters only for those who have taken enough coursework at Northeastern to be able to have at least two Northeastern faculty members write letters to the Committee. **Information Sessions are scheduled throughout the year. Call 617-373-2818 for the schedule and to reserve a place.**

Sources of Advice:

- General Advising, Application Procedures, and Entrance Exams
Dr. C. H. Ellis, Jr., Chair
Health Professions Advisory Committee
Biology Department
Northeastern University
445 Richards Hall
617-373-4032
- Course Schedules and Advising
Dr. Paula Vosburgh,
Health Professions Advisory Committee
Assistant Dean, Director, Health Professions and Sciences Programs
University College
266 Ryder Hall
617-373-2818
- or
- Ms. Catherine Ziegler
Assistant Director, Office of Academic and Student Affairs
University College
180 Ryder Hall
617-373-2400
- Questions on Physics Courses
Thomas Hulbert
Director, School of Engineering Technology
120 Snell Engineering Center
617-373-2500

Students must complete the courses below (see Course Sequences to meet Minimum Admission Requirements) before they may enroll in medical school, and should complete them before taking the school's particular admission test (MCAT, DAT, and so on. MCAT exam applications are available at the Department of Career Services, 120 Ryder Hall, 617-373-2430). Students intending to pursue pre-medical school studies should identify themselves to the Office of Academic and Student Affairs by calling 617-373-2400 prior to beginning their studies.

Course Sequences to Meet Minimum Admission Requirements

The following list shows acceptable course sequences that students can take at University College in preparation for health professional schools. Completing one sequence from each category should meet the *minimum* requirements of most medical or dental schools. If you have questions about whether other courses might be applicable, talk with Dr. Vosburgh or Dr. Ellis. Students are strongly encouraged to contact the medical or dental school(s) in which they are interested to obtain specific guidance on what courses the school may require for admission.

General Biology: BIO 4103, BIO 4104, BIO 4105—lab *must* be taken. Other biology work, such as anatomy and physiology and microbiology, may be acceptable, depending on the professional school. General biology is highly recommended even if you have already taken the other courses.

General Chemistry: CHM 4111, CHM 4112, CHM 4113—lab *must* be taken

Organic Chemistry: CHM 4261, CHM 4262, CHM 4263—lab *must* be taken

General Physics: PHY 4117, PHY 4118, PHY 4119, and labs PHY 4196, PHY 4197, PHY 4198*†

Math: MTH 4108, MTH 4120, MTH 4121*

English: ENG 4100, ENG 4111, ENG 4112

Two additional areas that are often required are behavioral science and biochemistry. The following courses meet these requirements.

Behavioral Science: PSY 4110, PSY 4111, PSY 4112, and/or other psychology courses

Biochemistry: CHM 4371, CHM 4372, CHM 4373 or BIO 4246, BIO 4247, BIO 4248

*These courses are scheduled through the School of Engineering Technology. Call 617-373-2500.

†Some medical schools have allowed PHY 4101 and PHY 4102 *College Physics 1 and 2* to be used for admissions. *Before* choosing this sequence, contact the school you wish to apply to for their preference for a physics course sequence.

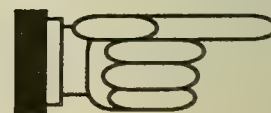
Bachelor's Degree in Biological Science offers Professional Opportunities

In offering this baccalaureate degree program in Biological Science, University College recognizes the critical role that a traditional biology major can play in preparing students for several distinguished professions. The program provides both a broad spectrum of biology courses and a firm foundation in the liberal arts and sciences. The balanced and comprehensive curriculum gives the students the background valued by medical, dental and veterinary schools. It would also be useful to those who desire to prepare for careers teaching science in secondary schools.

Biological Science Bachelor of Science Degree (Major Code 818)



Core Courses			quarter hours	
ENG 4100			Critical Writing 1	4
ENG 4111	ENG 4112		Critical Writing 2, 3	6
MTH 4107			College Algebra	4
MTH 4108			Pre-Calculus	4
PSY or	SOC electives		Psychology and Sociology	9
COM 4101			Foundations of Computer Literacy	4
LN or	MIS		Modern Language or Computer Language	8 or 9
Economics (ECN) <i>Courses of your choice</i>				9
History (HST) <i>Courses of your choice</i>				9
Major Concentration Courses				
BIO 4103	BIO 4104	BIO 4105	Biology 1, 2, 3	12
BIO 4175	BIO 4176		Human Anatomy and Physiology 1, 2	6
BIO 4190	BIO 4192		Microbiology 1, 3	6
BIO 4224	BIO 4225		Ecology 1, 2	6
BIO 4235	BIO 4236		Genetics 1, 2	6
BIO 4237			Genetics Laboratory	2
BIO 4246	BIO 4247		Cell Biology 1, 2	6
BIO 4248			Cell Biology Laboratory	2
CHM 4111	CHM 4112	CHM 4113	General Chemistry 1, 2, 3	9
CHM 4224			Analytical Chemistry (summer quarter)	4
CHM 4261	CHM 4262		Organic Chemistry 1, 2	8
MTH 4120	MTH 4121		Calculus 1, 2	8
MTH 4122			Calculus 3	(4)
or			or	
ECN 4250			Statistics 1	(3)
PHY 4117	PHY 4118	PHY 4119	Physics 1, 2, 3	12
PHY 4196	PHY 4197	PHY 4198	Physics Laboratory 1, 2, 3	3



Biological Science electives (Choose 15 q.h. from the following)

BIO 4177		Human Anatomy and Physiology 3	3
BIO 4191		Microbiology 2	3
BIO 4226		Ecology 3	3
BIO 4258	BIO 4259	Advanced Human Physiology 1, 2	6
BIO 4260		Cell, Tissue, and Organ Culture	3
BIO 4300		Computer Applications in Sciences	3
BIO 4320		Medical Microbiology	4
BIO 4374	BIO 4375	Histology 1, 2	6
BIO 4411	BIO 4412	Embryology and Development 1, 2	6
BIO 4441		Parasitology	4
BIO 4461		Immunology	4
BIO 1467		Molecular Biology	4

Electives as needed to complete credits

Total Quarter Hours **174**

Biotechnology

Associate in Science Degree

The program in Biotechnology helps provide the chemistry and biology foundation required for medical and industrial laboratory assistants and technicians and for persons who have paramedical responsibilities. Employment opportunities may be found in hospitals, health clinics, research foundations, chemical and drug industries, public health organizations, water and sanitation departments.

Bachelor of Science Degree

The Bachelor of Science degree program in Biotechnology integrates theoretical and laboratory courses from the fields of chemistry and biology. The program is designed to help prepare students for responsibilities in laboratory careers. Employment opportunities may be found in a variety of industrial, pharmaceutical, clinical, and hospital laboratories.

Biotechnology Associate in Science Degree (Major Code 812)



Core Courses			quarter hours	
ENG 4100			Critical Writing 1	4
ENG 4111	ENG 4112		Critical Writing 2, 3	6
History (HST)	<i>Courses of your choice</i>			9
MTH 4110	MTH 4111	MTH 4112	Contemporary Algebra 1, 2, 3	9
Major Concentration Courses				
BIO 4103	BIO 4104	BIO 4105	Biology 1, 2, 3	12
BIO 4175	BIO 4176	BIO 4177	Human Anatomy and Physiology 1, 2, 3	9
BIO 4190	BIO 4191	BIO 4192	Microbiology 1, 2, 3	9
CHM 4111	CHM 4112	CHM 4113	General Chemistry 1, 2, 3	9
CHM 4261	CHM 4262	CHM 4263	Organic Chemistry 1, 2, 3	(12)
<i>or</i>			<i>or</i>	
CHM 4221	CHM 4222	CHM 4223	Analytical Chemistry 1, 2, 3	(9)
PHY 4101	PHY 4102		College Physics 1, 2	8
Electives				
Liberal Arts				6
Chemistry, Biology, or Calculus as needed to complete total credits				3-6
Total Quarter Hours				96

Biotechnology Bachelor of Science Degree (Major Code 813)



Core Courses

			quarter hours
ENG 4100		Critical Writing 1	4
ENG 4111	ENG 4112	Critical Writing 2, 3	6
MTH 4110	MTH 4111	Contemporary Algebra 1, 2, 3	9
BIO 4103	BIO 4104	Biology 1, 2, 3	12
BIO 4175	BIO 4176	Human Anatomy and Physiology 1, 2, 3	9
		General Chemistry 1, 2, 3	9
CHM 4111	CHM 4112	College Physics 1, 2	8
PHY 4101	PHY 4102		
Economics (ECN) Courses of your choice			6
History (HST) Courses of your choice			6
Psychology (PSY) or Sociology (SOC) Courses of your choice			6

Major Concentration Courses

BIO 4190	BIO 4191	BIO 4192	Microbiology 1, 2, 3	9
BIO 4224	BIO 4225	BIO 4226	Ecology 1, 2, 3	9
BIO 4235	BIO 4236	BIO 4237	Genetics 1, 2, and Lab	(8)
or			or	
BIO 4246	BIO 4247	BIO 4248	Cell Biology 1, 2, and Lab	(8)
BIO 4374	BIO 4375	BIO 4376	Histology 1, 2, 3	9
BIO 4455			Introduction to Biotechnology	3
CHM 4221	CHM 4222	CHM 4223	Analytical Chemistry 1, 2, 3	9
CHM 4261	CHM 4262	CHM 4263	Organic Chemistry 1, 2, 3	12
CHM 4321	CHM 4322	CHM 4323	Instrumental Analysis 1, 2, 3	9
CHM4371	CHM4372	CHM 4373	Biochemistry 1, 2, 3	9

Biotechnology electives

Choose 15 q.h. from the following:

BIO 4411	BIO 4412	Embryology and Development 1, 2	(6)
BIO 4441		Parasitology	(4)
BIO 4461		Immunology	(4)
CHM 4271		Introduction to Immunodiagnostics	(3)
CHM 4391		Introduction to Recombinant DNA	(3)
CHM 4392		Affinity Chromatography in Biological Separations	(3)
		Development of New Virus Vaccines	(3)
BIO 4501		Computer Application in Science	(3)
BIO 4300			

General Electives	7
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Total Quarter Hours	174
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Health Information Administration

The Health Information Administrator's varied responsibilities relate to information systems and include the organization, operation and management of health information services. Required skills for this profession include the ability to design health information and retrieval systems; develop, analyze and evaluate health records and indexes; work with medical and administrative staffs within health care facilities developing methods for evaluation of patient care; and conduct research projects using health information.

Health Information Administrators work in a variety of health care settings. About 75% are employed by hospitals and ambulatory care facilities as directors, assistant directors or supervisors of Health Information Departments. They are also employed by government agencies, insurance companies, law firms, and health information programs at colleges and universities. A growing number of Health Information Administrators work for computer companies that market health information software.

Students who successfully complete this program are eligible to take the national credentialing examination conducted by the American Health Information Management Association. Candidates who successfully complete this examination are known as Registered Record Administrators (RRA).

It is strongly urged that potential students attend an information session and speak with the Program Director. Call 617-373-2818 for a schedule of information sessions.

Professional Programs

The Health Information Program at University College offers a Bachelor's Degree Program and a Post-Baccalaureate Certificate Program.

The Bachelor of Science Degree Program is designed for individuals who wish to obtain a degree in health information administration. The Post-Baccalaureate Certificate Program is designed for those with a bachelor's degree in any area, who wish to change careers. Previous college credits obtained at another accredited college or university may be transferred into either program using the Transfer Credit Petition Form obtained from University College's Office of Academic and Student Affairs.

Each program may be completed on a part-time or accelerated basis. Although students may begin either program at anytime of the year, there are established suggested patterns of courses that begin in either the Summer or Fall quarters of each year. Prior to beginning any of these patterns, Post-Baccalaureate Certificate students must have completed the pre-requisite coursework in statistic, anatomy and physiology and computer literacy. These are explained at the information sessions mentioned above.

Specific courses designated (*) in the curricula of both programs require a grade of C or better. Only one professional course may be repeated. Students who receive a grade of D in more than one professional course will be withdrawn from the program. A quality-point average of 2.5 is essential in order to enter any of the three clinical courses. Post-Baccalaureate Certificate students must complete their program of study with at least a QPA of 2.5 in order to receive a certificate from University College. Degree and certificate students who successfully complete their programs of study are eligible to take the national credentialing examination.

Health Information Administration Bachelor of Science Degree (Major Code 864)



Core Courses			quarter hours
ENG 4100		Critical Writing 1	4
ENG 4111	ENG 4112	Critical Writing 2, 3	6
MTH 4110	MTH 4111	Contemporary Algebra 1, 2	6
BIO 4103	BIO 4104	Biology 1, 2, 3	12
BIO 4175	BIO 4176	Human Anatomy and Physiology 1, 2, 3*	9
ECN 4115	ECN 4116	Economic Principles and Problems 1, 2, 3	9
	ECN 4117	Statistics 1, 2	6
ECN 4250	ECN 4251		9
Psychology (PSY) Courses of your choice			9
History (HST) or Political Science (POL) Courses of your choice			9
Sociology (SOC) Courses of your choice			9
Major Concentration Courses			
COM 4101		Foundations of Computer Literacy††	4
HMG 4100		Hospital Organization and Management* ††	3
HMG 4215		Health Law* ††	3
HMG 4301		Health Care Delivery Systems* ††	3
HMG 4400		Health Care Finance*	3
HMG 4411		Research for Managers*	3
HRM 4301		Organizational Behavior*	3
HRM 4310		Human Resource Management	3
HSC 4301	HSC 4302	Pathophysiology 1, 2*	6
Professional Courses			
HIA 4300		Medical Terminology*†	4
HIA 4315	HIA 4316	Health Information Administration 1, 2*	6
HIA 4328	HIA 4329	Nomenclature and Classification 1, 2*	6
HIA 4335	HIA 4336	Clinical Practicum 1, 2, 3*	8
HIA 4400	HIA 4337	Specialized Health Information Systems*	3
HIA 4410		Quality Assurance*	4
HIA 4330	HIA 4431	Health Information Management 1, 2*	6
HIA 4500		Health Information Computer Systems*	3
HIA 4520		Topics in Health Information Administration*	3
General Electives			21
Total Quarter Hours			174

*Students must obtain a grade of C or better in this course.

†A challenge examination is available for this course. Call 617-373-2818 for details.

††It is recommended that these courses be taken at the beginning of the student's course of study.



Health Information Administration Post-Baccalaureate Certificate (Major Code 868)

Pre-requisite Coursework

- 1. One year of Anatomy and Physiology with Laboratory: grade of C or better.
Suggested courses: BIO 4175, 4176, 4177
- 2. Introduction to Computers. Suggested course: COM 4101.
- 3. Descriptive Statistics. Suggested course: HMG 4200.

Core Courses		quarter hours	
HMG 4100		Hospital Organization and Management* ††	3
HMG 4215		Health Law* ††	3
HMG 4301		Health Care Delivery Systems * ††	3
HMG 4400		Health Care Finance*	3
HMG 4411		Research for Managers*	3
HRM 4310		Human Resource Management	3
HSC 4301	HSC 4302	Pathophysiology 1, 2*	6
Professional Courses			
HIA 4300		Medical Terminology*††	4
HIA 4315	HIA 4316	Health Information Administration 1, 2*	6
HIA 4328	HIA 4329	Nomenclature and Classification 1, 2*	6
HIA 4335	HIA 4336	Clinical Practicum 1, 2, 3*	8
HIA 4400	HIA 4337	Specialized Health Information Systems*	3
HIA 4410		Quality Assurance*	4
HIA 4430	HIA 4431	Health Information Management 1, 2*	6
HIA 4500		Health Information Computer Systems*	3
HIA 4520		Topics in Health Information Administration*	3
Total Quarter Hours			67

*Students must receive a C or better in this course.
†A challenge examination is available for this course. Call 617-373-2818 for details.
††It is recommended that these courses be taken at the beginning of the student's course of study.

Health Management

The health care industry is changing rapidly in response to increasing competition, rising costs, technological advances, the growth of alternative delivery systems, and an aging population.

University College's Bachelor of Science Degree program in Health Management is intended for those who wish to prepare for entry into or advancement in managerial positions in the health care field.

The program combines professional competencies with a liberal arts education to help direct students toward either entry-level positions or positions of increasing responsibility in health services administration. The curriculum also provides a foundation for graduate studies in MBA and MHA programs.

Health Management Bachelor of Science Degree (Major Code 860)



Core Courses			quarter hours	
ENG 4100			Critical Writing 1	4
ENG 4111	ENG 4112		Critical Writing 2, 3	6
MTH 4110	MTH 4111	MTH 4112	Contemporary Algebra 1, 2, 3	9
HMG 4200			Health Science Statistics	3
ECN 4115	ECN 4116	ECN 4117	Economic Principles and Problems 1, 2, 3	9
SOC 4100			Roles, Culture, and the Individual	3
POL 4103			Introduction to Politics	3
PSY 4110			Introduction to Psychology: Fundamental Issues	3
COM 4101			Foundations of Computer Literacy	4
Basic Concentration Courses				
ACC 4101	ACC 4102		Accounting Principles 1, 2	6
FI 4301			Principles of Finance	3
HMG 4100	HMG 4101		Hospital Organization and Management 1, 2*	6
HMG 4215			Health Law	3
HMG 4301			Health Care Delivery Systems*	3
HMG 4411			Research for Managers	3
Advanced Concentration Courses				
HMG 4260			Senior Seminar in Health Care Management †	1
HMG 4325			Health Planning and Regulation	3
HMG 4390			The Patient's Impact on Decision-Making	3
HMG 4400	HMG 4401		Health Care Financial Management 1, 2	6
HMG 4429			Health Care Delivery's Changing Environment †	2
HMG 4440			Health Care Operations Management	3
HMG 4445	HMG 4446		Health Care Marketing and Communication 1, 2	6
HMG 4580			Information Processing in Health Care	3
HMG 4650	HMG 4651		Health Management Practicum 1†, 2†	12
HSC 4310			Public Health 1	3
Professional Specialization				
See Option 1, 2 or 3 on next page				27
Electives				
Liberal Arts electives				10
Health Science electives				6
Science electives (CHM, BIO, ESC, MTH)				12
Open electives				9
Total Quarter Hours				174

*It is strongly advised that students take these courses at the beginning of their studies.
†Must be taken concurrently during the student's last year in the program.
††Students must have completed seventy-five percent of their degree requirements before taking these courses. Students must apply for each assignment no later than one full quarter prior to the desired starting date.

Professional Specialization Options

Students complete their course of study by electing one of the following 27 quarter-hour options designed to meet their professional objectives.

Option 1: Continuing Care Administration

Licensure as a nursing home administrator requires an internship, a licensure examination, and a bachelor's degree. The required courses in this option help prepare students for the Massachusetts Licensure Examination. Students are advised, however, to contact the Board of Registration of Nursing Home Administrators for the specific eligibility requirements needed for this examination.

HMG 4600	HMG 4601	HMG 4602	Long-Term Care Administration (A, B, C)*	18
<i>Choose nine quarter hours from the following:</i>				
SOC 4225			Social Gerontology	(3)
HMG 4300			Home Health Care	(3)
REC 4401			The Nursing Home Experience	(3)
REC 4460			The Process of Aging	(3)
HSC 4210			Basic Nutrition	(3)
HSC 4220			Basic Pharmacology	(3)

*This series of courses offered in 1994-95 academic year.

Option 2: Community Health Management

HMG 4310	HMG 4311	Principles and Practices of Community Health 1, 2	6
MLS 4341	MLS 4342	Epidemiology 1, 2	6
HSC 4311		Public Health 2	3
<i>Choose twelve quarter hours from the following:</i>			
ACC 4110		Management Control for Nonprofit Organizations	(3)
HMG 4300		Home Health Care	(3)
HMG 4550	HMG 4551	Contemporary and Controversial Health Care Issues 1, 2	(6)
HMG 4610		Principles and Practices of Community Mental Health	(3)
HRM 4320		Techniques of Employee Selection	(3)
HRM 4340		Public Sector Collective Bargaining in the United States	(3)
HSC 4315		Environmental Problems and Health	(3)
MKT 4335		Public Relations 1	(3)
SOC 4215		Medical Sociology	(3)
SOC 4241		Human Services Professions	(3)
SOC 4240		Sociology of Human Service Organizations	(3)

Option 3: General

<i>Choose courses from (EMS, HIA, HMG, HSC, MLS, NUR, REC, RAD)</i>				15
<i>Choose 12 quarter hours from the following:</i>				
ECN 4130		Medical Economics	(3)	
ECN 4321		Urban Economic Problems and Policies	(3)	
ENG 4380		Business Writing and Reports 1	(3)	
FI 4326		Financial Control	(3)	
FI 4325		Budgeting and Planning	(3)	
FI 4321		Credit Management	(3)	
HRM 4321		Wage and Salary Administration	(3)	
HRM 4322		Employee Benefits	(3)	
HRM 4323		Job Evaluation	(3)	
HRM 4341		Private Sector Collective Bargaining in the United States	(3)	
MGT 4320		Managing Change	(3)	
POL 4300		Introduction to Public Administration	(3)	

Health Science

With the rapidly changing health care industry and the steadily expanding awareness of the importance of health, many new and exciting opportunities exist for those interested in the health care field. The Bachelor of Science in Health Science program seeks to address the needs of both health professionals seeking a broad-based baccalaureate degree as well as those interested in investigating a variety of disciplines within health. For those who already possess training as health professionals, maximum transfer of professional coursework is possible. Those entering from other fields or investigating career options in health will find a curriculum which allows flexibility in choosing coursework towards a specific goal. A program of upper-level courses and advanced sciences allows the student flexibility in pursuing a variety of post baccalaureate options as well.

Students should be aware that in order to work in certain health professions, certification or licensure is required. If you are interested in a field such as: Medical Laboratory Science, (specific tracks of courses exist in Clinical Chemistry, Clinical Microbiology, Hematology, Blood Banking and Clinical Immunology); Sonography; Paramedic; etc., you should see the appropriate individual in that area. Please refer to page 101 for names and telephone numbers of consultants in various health fields.

Health Science Bachelor of Science in Health Science Degree (Major Code 865)



Liberal Arts			quarter hours
ENG 4100		Critical Writing 1	4
ENG 4111	ENG 4112	Critical Writing 2, 3	6
Humanities (ART, ASL, CMN, DRA, ENG, JRN, LN, MUS, PHL, TCC)			9
Social Sciences (ECN, HST, POL, PSY, SOA, SOC)			9
General Liberal Arts (ART, ASL, CMN, DRA, ENG, JRN, LN, MUS, PHL, TCC, ECN, HST, POL, PSY, SOA, SOC)			6
MTH 4110	MTH 4111	MTH 4112	Contemporary Algebra 1, 2, 3
			9
Basic Sciences			
BIO 4103		Biology 1	4
BIO 4104	or	BIO 4105	Biology 2 or 3
BIO 4175	BIO 4176	BIO 4177	Human Anatomy and Physiology 1, 2, 3
BIO 4190			Microbiology 1
CHM 4111	CHM 4112	CHM 4113	General Chemistry 1, 2, 3
COM 4101			Foundations of Computer Literacy
			4
Advanced Sciences			
Choose 12 quarter hours from the following:			
BIO 4224	BIO 4225	BIO 4226	Ecology 1, 2, 3
BIO 4235	BIO 4236	BIO 4237	Genetics 1, 2, and Lab
BIO 4246	BIO 4247	BIO 4248	Cell Biology 1, 2, and Lab
BIO 4258	BIO 4259		Advanced Human Physiology 1, 2
BIO 4320			Medical Microbiology
BIO 4455			Introduction to Biotechnology
BIO 4461			Immunology
CHM 4221	CHM 4222	CHM 4223	Analytical Chemistry 1, 2, 3
CHM 4224			Analytical Chemistry (summer only)
CHM 4261	CHM 4262	CHM 4263	Organic Chemistry 1, 2, 3
CHM 4371	CHM 4372	CHM 4373	Biochemistry 1, 2, 3
MTH 4130	MTH 4131	MTH 4132	College Calculus 1, 2, 3
PHY 4101	PHY 4102		College Physics 1, 2
PHY 4117	PHY 4118	PHY 4119	Physics 1, 2, 3 and
PHY 4196	PHY 4197	PHY 4198	Labs
			(9)
			(8)
			(8)
			(6)
			(4)
			(3)
			(4)
			(9)
			(4)
			(12)
			(9)
			(9)
			(8)
			(15)
Basic Concentration Courses			
Required			
HMG 4215		Health Law	3
HMG 4301		Health Care Delivery	3
HSC 4310		Public Health 1	3
MLS 4341		Epidemiology 1	3
Choose 18 quarter hours from the following:*			
EMS 4107		EMT-Basic	(9)
HMG 4210	HMG 4211	Medical Care and Current	
		Social Problems 1, 2	(6)
HSC 4210		Basic Nutrition	(3)
HSC 4220		Basic Pharmacology	(3)
HSC 4311		Public Health 2	(3)
HSC 4613		Oral Microbiology	(3)
HSC 4614	HSC 4615	Advanced Periodontology 1, 2	(6)
MLS 4104		Introduction to Phlebotomy	(4)
MLS 4301		Medical Lab Orientation	(2)
MLS 4342		Epidemiology 2	(3)
RAD 4100		Radiologic Technology Orientation	(3)



Major Concentration Courses

Required

HMG 4100	HMG 4101	Hospital Organization and Management 1, 2	6
HMG 4200		Health Science Statistics	3
HSC 4301	HSC 4302	Pathophysiology 1, 2	6
HSC 4320	HSC 4321	Training and Development in the Health Professions 1, 2	6
<i>Choose 21 quarter hours from the following electives.**</i>			
HMG 4310	HMG 4311	Principles and Practices of Community Health 1, 2	(6)
HMG 4550	HMG 4551	Contemporary and Controversial Health Care Issues 1, 2	(6)
HSC 4315		Environmental Problems and Health	(3)
HSC 4600		Advanced Nutrition	(3)
HSC 4601		Advanced Pharmacology	(3)
HSC 4610		Geriatric Nutrition	(3)
MLS 4321		Hematology	(3)
MLS 4322	MLS 4323	Morphologic Hematology 1, 2	(6)
MLS 4365		Quality Control	(3)
RAD 4304		Cross-Sectional Anatomy	(4)
RAD 4400		Head & Neck Anatomy	(3)
RAD 4450		Comp. Body Tomography	(3)
RAD 4460		Medical Imaging Quality Assurance	(3)
REC 4460		Process of Aging	(3)

Electives as needed to complete total credits.

Total Quarter Hours

174

*Entry level professional courses (Medical Laboratory Science, Nursing, Radiologic Technology, Paramedic Technology, etc.) may fulfill this requirement. It is imperative that students who desire to use this option have their courses pre-approved by the Office of Academic and Student Affairs. This should be done at the start of your coursework in University College.

**Others may be considered by petition. Specialized tracks are available in Medical Laboratory Science.

Medical Laboratory Science

Medical laboratory science (MLS) is concerned with laboratory examination of material necessary for monitoring health and for diagnosing and treating illness. Medical laboratory technicians and technologists work in a variety of specialized fields such as microbiology, blood banking, hematology immunology, or clinical chemistry, or as generalists in all of these areas.

The medical laboratory technician holding an associate's degree, works under the direct supervision of a medical technologist and performs common medical laboratory tests. The medical technologist, who must have a bachelor's degree, is considered qualified to perform tests with little or no direct supervision. Students interested in progressing past a technician level in Medical Laboratory Science should investigate the Bouvé College of Pharmacy and Health Sciences' full-time day bachelor's degree program or University College's part-time evening Bachelor of Science in Health Science program. It is imperative that students meet and plan out their coursework with the Medical Laboratory Science Program Director (617-373-3664) prior to beginning work in this major. This will assure appropriate course selection in order to qualify for clinical certification(s). With additional education or experience, medical technologists can become educators, researchers, or supervisors. They may serve as sales and technical representatives for scientific supply and equipment companies or serve in government positions.

The associate degree program is conducted in affiliation with Boston-area hospitals and is accredited by the Committee of Allied Health Education and Accreditation of the American Medical Association. Upon successful completion of the associate's degree program, the student is eligible to take a national certification examination given by the National Certification Agency for Medical Laboratory Personnel or the Board of Registry of the American Society of Clinical Pathologists.

The basic courses in medical laboratory science, science, and education are offered evenings, but the advanced medical laboratory science courses and the clinical experience are offered full-time during the day only.

Associate's Degree Professional Requirements

A clinical applied study program (or appropriate work experience) is required for this degree. Work experience is acceptable if it meets the requirements for certification of either the National Certification Agency for Medical Laboratory Personnel or the Board of Registry of the American Society of Clinical Pathologists. Students without appropriate work experience can apply for clinical applied studies through the University College MLS Clinical Coordinator, 206 Mugar, 617-373-3664. This should be done one year in advance of the anticipated entry into clinical courses.

Prerequisites for clinical applied studies are a minimum of a 2.0 quality-point average in the required courses and a C- or better in each medical laboratory science (MLS) course. These basic courses are available during the evening and on an every-other-year basis through the Bouvé College of Pharmacy and Allied Health Professions. Students register for these courses in the Bouvé College of Pharmacy and Health Sciences, 206 Mugar. Tuition is at a special rate. These courses should be completed within three years of applying to the AD-MLT Clinical Applied Studies.

Medical Laboratory Science—Medical Laboratory Technician Associate in Science Degree (Major Code 800)



Core Courses

ENG 4100		
ENG 4111	ENG 4112	
HMG 4210		
HMG 4215		
MTH 4110	MTH 4111	
BIO 4103	BIO 4105	
BIO 4175	BIO 4176	BIO 4177
CHM 4111	CHM 4112	CHM 4113

	quarter hours
Critical Writing 1	4
Critical Writing 2, 3	6
Medical Care and Current Social Problems	3
Health Law	3
Contemporary Algebra 1, 2	6
Biology 1, 3	8
Human Anatomy and Physiology 1, 2, 3	9
General Chemistry 1, 2, 3	9

Major Concentration Courses †

MLS 4301	Medical Laboratory Science Orientation	2
MLS 1112	Renal Physiology/Urinalysis*	2
MLS 1212	Renal Physiology/Urinalysis Lab*	1
MLS 1172	Immunology*	2
MLS 1123	Hematology 1*	2
MLS 1223	Hematology 1 Lab*	1
MLS 1124	Hematology 2*	2
MLS 1224	Hematology 2 Lab*	1
MLS 1142	Microbiology 1*	3
MLS 1242	Microbiology 1 Lab*	1
MLS 1132	Immunohematology*	3
MLS 1232	Immunohematology Lab*	1
MLS 1144	Microbiology 2*	1
MLS 1244	Microbiology 2 Lab*	1
MLS 1152	Clinical Chemistry*	4
MLS 1252	Clinical Chemistry Lab*	1
MLS 1412	MLT Special Topics*	2
MLS 1423	MLT Hematology Applied Study*	2
MLS 1432	MLT Immunohematology Applied Study*	2
MLS 1442	MLT Microbiology Applied Study*	2
MLS 1452	MLT Clinical Chemistry Applied Study*	2
MLS 1480	MLT Seminar 1*	2

Electives

Computer science electives	3-4
Liberal Arts electives	6

Total Quarter Hours 97-98

*Tuition for this course is at a special rate. Call 617-373-3664 to register.
†Challenge examinations are available for many of the major concentration courses. Those working in the field may want to investigate this option by speaking with the program director at 617-373-3664.

Nursing (Evening Section)

The College of Nursing's Bachelor of Science degree in Nursing, accredited by the National League for Nursing, is offered to Registered Nurses on a part-time curriculum schedule through University College. Individual counseling, assessment of prior learning experiences, planning for progression and flexible scheduling of course requirements are offered to facilitate educational advancement and achievement of personal and professional goals.

Admission Procedure

Admissions applications are available from the Health Professions and Science Office, 266 Ryder Hall or by calling (617) 373-2818.

The following items are required for admission to this study option and should be forwarded to the Office of Academic and Student Affairs; University College, Northeastern University, 180 Ryder Hall, 360 Huntington Avenue, Boston, MA 02115:

- Completed Nursing Program application
- Official transcripts from basic nursing program
- Official transcripts from all colleges attended (If college courses were completed while attending a diploma program, an individual transcript from that college must be included.)
- Evidence of current licensure as a Registered Nurse
- Satisfactory performance on the NLN Mobility Profile II or ACT/PEP examinations.

Pre-admission and academic counseling is available by calling the Office of Academic and Student Affairs at 617-373-2400 or TTY 617-373-2825 for an appointment.

Prospective students may obtain a status report, detailing courses that are acceptable for transfer from other institutions as well as the remaining coursework to be completed by contacting the Office of Academic and Student Affairs, 617-373-2400 or TTY 617-373-2825.

Planning a Program of Study

Potential students are encouraged to attend group information sessions in order to increase their awareness of College of Nursing and University College policies. These sessions cover course requirements, promotional policies, advanced placement procedures, and the process of petitioning. To register for these sessions, call 617-373-2818.

Nursing (Evening Section) Bachelor of Science in Nursing

(Major Code 809)



Core Courses			quarter hours	
ENG 4100			Critical Writing 1	4
ENG 4111	ENG 4112		Critical Writing 2, 3	6
BIO 4103			Biology 1	4
BIO 4175	BIO 4176	BIO 4177	Human Anatomy and Physiology 1, 2, 3	9
BIO 4190			Microbiology 1	3
CHM 4111	CHM 4112	CHM 4113	General Chemistry 1, 2, 3	9
Computer (COM) course of your choice				4
MTH 4110			Contemporary Algebra 1	3
NUR 4302			Pharmacodynamics	(3)
or			or	
HSC 4601			Advanced Pharmacology	(3)
PSY 4110			Introduction to Psychology:	
			Fundamental Issues	3
PSY 4111			Introduction to Psychology:	
			Developmental Aspects	3
PSY 4112			Introduction to Psychology:	
			Personal Dynamics	3
PSY 4240			Development: Infancy and Childhood	3
PSY 4241			Development: Adolescence	3
PSY 4242			Development: Adulthood and Aging	3
SOA 4101			Cultural Anthropology:	
			Kinship Societies	3
SOA 4102			Cultural Anthropology:	
			State Societies	3
SOC 4100			Roles, Culture, and the Individual	3
SOC 4101			Inequality and Institutions	3
History (HST) Course of your choice				3
Major Concentration Courses*				
NUR 4300			Nursing Transition	9
Advanced Standing Credit given upon completion of NUR 4300				22
NUR 4301			Psychiatric/Mental Health Nursing†	7
NUR 4400			Maternal and Child Nursing†	9
NUR 4401			Medical Surgical Nursing†	9
NUR 4500			Community Health Nursing	9
NUR 4502			Introduction to Nursing Research	4
NUR 4504			Contemporary Issues in Nursing	2
NUR 4505			Introduction to Leadership and Management in Patient Care	3
Electives				
Humanities				9
Open electives				17
Total Quarter Hours				177-178

*Students must submit a petition to enter *each* nursing course. Petitions must be submitted at least one full quarter in advance of registering. A current status petition must accompany each petition. Students petitioning to enter NUR 4300, Nursing Transition, must also obtain a health clearance from the Lane Health Center, present evidence of having had a tuberculin skin test within the previous twelve months, and present a Hepatitis vaccine statement.

†Challenge examinations are available for this course through the NLN Mobility Profile II Examination or the ACT PEP Examination. Successful completion of either set of exams is a component of the admissions process.

Paramedic Technology

University College provides the opportunity to earn a certificate as well as an associate's degree in Paramedic Technology. Major concentration areas involve the EMT-Paramedic's roles, responsibilities and the subject areas required by Massachusetts Department of Public Health regulations and national guidelines. These areas include: medical terminology, patient assessment and initial management, airway and ventilation, pathophysiology of shock, general pharmacology, trauma and burns, respiratory system, cardiovascular system, endocrine emergencies, nervous system, acute abdomen, genitourinary and reproductive systems, anaphylaxis, toxicology, alcoholism and drug abuse, infectious diseases, environmental injuries, geriatrics, pediatrics, obstetrics, gynecological and neonatal emergencies, behavioral emergencies, EMS systems, medical/legal considerations, communications, rescue, major incident response, and stress management.

Admissions requirements: completion and submission of an application form; high school diploma or equivalent; national, state or provincial certification as an Emergency Medical Technician; official high school and college transcripts; entrance examination; Admissions Committee interview; and physical examination.

Students who successfully complete the Paramedic Technology Certificate Courses may continue with the liberal arts and computer courses necessary for an Associate in Science in Paramedic Technology Degree.

Whether or not students continue on to the associate level, all those certified in Paramedic Technology may apply for and take the National Registry of Emergency Medical Technicians Paramedic Certification Examination.

Paramedic Technology Associate in Science Degree (Major Code 874)



Major Concentration/Certificate Courses			quarter hours	
EMS 4117	EMS 4118	EMS 4119	Emergency Medical Services 1, 2, 3, 4	24
EMS 4120			Emergency Medical Services 5, 6	22
EMS 4121	EMS 4122		Emergency Medical Service 7	3
EMS 4123			Human Anatomy and Physiology A and B	8
BIO 4178	BIO 4179			
Liberal Arts and Computer Courses				
ENG 4100			Critical Writing 1	4
ENG 4111	ENG 4112		Critical Writing 2, 3	6
MTH 4110	MTH 4111		Contemporary Algebra 1, 2	6
CMN 4101			Fundamentals of Human Communication	3
PSY 4110			Introduction to Psychology: Fundamental Issues	3
PSY 4112			Introduction to Psychology: Personal Dynamics	3
HST 4103			The Civilization of the Modern World	3
LNS 4200			Spanish for the Medical Professions	4
COM 4101			Foundations of Computer Literacy	4
Electives				3
Total Quarter Hours				97

Radiologic Technology

The Radiologic Technology program is a joint offering of the University and several area hospitals. Classroom experience is provided by the University, and the laboratory practicum is conducted at an assigned affiliated hospital. The program is accredited by the Council on Medical Education of the American Medical Association.

The Radiologic Technologist is a skilled professional employed in the diagnostic and therapeutic areas of the hospital, as well as in industrial production, quality control, and inspection laboratories. Students in the Radiography program gain exposure in advanced imaging and therapeutic areas such as computerized tomography, magnetic resonance imaging, ultrasonography, nuclear medicine, and radiation therapy. Each of the three associate of science degree options allows graduates to continue into the bachelor of science degree programs in health science or health management through University College.

Entrance Criteria: Satisfactory completion of three years of high school math, one year of biology, and one year of chemistry or physics. Applicants should also submit a letter of recommendation from a science instructor. Alternatively, applicants may submit a letter from a current employer addressing the applicant's potential to succeed in the program.

Candidates who meet the above requirements should file an application and supply all necessary documents by the appropriate deadlines. (See below.) No candidate will be considered until all documents and fees are received in the program office. Only admitted students are allowed to take Radiologic Technology (RAD) courses.

Associate in Science Degree *Full-Time* Day Program (806)

This associate in science degree program is a full-time day program. Graduates are eligible to take the examination for certification by the American Registry of Radiologic Technologists. The full-time day curriculum is scheduled over twenty-seven months with early exit options available for students with transfer credit or students who wish to take an accelerated course sequence. Early exit provides graduates with the opportunity to enter the job market and/or begin work on their bachelor degree studies. The application deadlines for the full-time day program are October 15 or March 1.

Associate in Science Degree *Part-Time* Evening Program (811)

A part-time evening option exists for students unable to participate in the full-time day program. Required academic classes are scheduled during the evening over twenty-four consecutive months. Following the academic courses, the student will complete the program requirements by participating in up to one year of full-time clinical experience in an assigned hospital setting. Class size is limited. The application deadline for the part-time program is April 1.

Part-Time Evening Program for Radiographers (810)

University College also offers an associate of science degree program for registered technologists; the program requires fewer major concentration courses. Candidates who wish to apply to this program must document satisfactory completion of an accredited certificate program in radiologic technology or be certified by the American Registry of Radiologic Technologists.

Radiologic Technology Associate in Science Degree (Major Codes 806/811)



Core Courses			quarter hours	
BIO 4103			Biology 1	4
BIO 4175	BIO 4176	BIO 4177	Human Anatomy and Physiology 1, 2, 3	9
COM 4101			Foundations of Computer Literacy	4
ENG 4100			Critical Writing 1	4
ENG 4111	ENG 4112		Critical Writing 2, 3	6
HMG 4100			Hospital Organization and Management 1	3
MTH 4110	MTH 4111		Contemporary Algebra 1, 2	6
PSY 4110			Introduction to Psychology: Fundamental Issues	3

Major Concentration Courses (Only admitted students allowed to take RAD courses; must be passed with a C or better.)

RAD 4100	RAD 4101		Radiologic Technology Orientation 1, 2	6
RAD 4102	RAD 4103		Radiologic Science 1, 2	8
RAD 4104	RAD 4105		Principles of Radiology 1, 2	8
RAD 4106	RAD 4107		Radiologic Photography and Exposure 1, 2	8
RAD 4116	RAD 4117	RAD 4118	Radiology Practicum 1, 2, 3, 4	16
RAD 4119			Principles of Photography and Exposure Lab 1, 2	2
RAD 4121	RAD 4122		Cross-Sectional Anatomy	4
RAD 4304			Advanced Radiologic Technology	4
RAD 4305			Radiation Protection—Radiobiology	4
RAD 4306				

Total Quarter Hours 99

Part-Time Associate in Science Degree Program for Radiographers (Major Code 810)



Core Courses			quarter hours	
Transfer credit for completion of prerequisite*				50
BIO 4103			Biology 1	4
COM 4101			Foundations of Computer Literacy	4
ENG 4100			Critical Writing 1	4
ENG 4111	ENG 4112		Critical Writing 2, 3	6
HMG 4100			Hospital Organization and Management	3
MTH 4110	MTH 4111		Contemporary Algebra 1, 2	6
PSY 4110			Introduction to Psychology: Fundamental Issues	(3)
or			or	
SOC 4100			Roles, Culture, and the Individual	(3)
PSY 4111			Introduction to Psychology: Developmental Aspects	(3)
or			or	
SOC 4101			Inequality and Institutions	(3)
Major Concentration Courses				
RAD 4300			Advanced Radiologic Technology	4
RAD 4304			Cross-Sectional Anatomy	4
RAD 4306			Radiation Protection—Radiobiology	3
RAD 4460			Medical Imaging Quality Assurance	3

Total Quarter Hours 97

*Prerequisite: Satisfactory completion of a certificate program in radiologic technology or registration by the American Registry of Radiologic Technologists.

Liberal Arts Degree Programs

*Director, Liberal Arts Programs ,
to be announced*

266 Ryder Hall
617-373-2416, 373-2423

Nancy Bandoian,
*Assistant to the Director,
Liberal Arts Programs*

Program Consultants and Advisors

ART: Arts and Graphics

Consultant: Prof. Peter Serenyi, Chair,
Dept. of Art and Architecture
(College of Arts and Sciences)
Associate Consultant and Program Advisor:
Daniel Vardaro

ASL: American Sign Language

Consultant and Program Advisor:
Nancy V. Becker, Coordinator,
Educational Services, ASL Program
(College of Arts and Sciences)

CMN: Communication Studies

Consultant/Program Advisor:
Prof. Michael Woodnick,
Communication Studies Dept.
(College of Arts and Sciences)

DRA: Drama

Consultant: Prof. Mort S. Kaplan,
Theatre and Dance Dept.
(College of Arts and Sciences)

ECN: Economics

Consultant: Prof. John Adams, Chair,
Economics Dept.
(College of Arts and Sciences)
Associate Consultant/Program Advisor:
Dr. Herbert J. Eskot

ENG: English (Literature or Writing)

Consultant: Prof. M. X. Lesser,
English Dept.
(College of Arts and Sciences)
Associate Consultant, Business Writing:
Rosemarie Dittmer

HST: History

Consultant: Prof. Raymond H. Robinson,
History Dept. (College of Arts and Sciences)
Associate Consultant/Program Advisor:
Prof. Gerald H. Herman, History Dept.
(College of Arts and Sciences)

JRN: Journalism, Public Relations, and Advertising

Consultant and Program Advisor:
Prof. Larue W. Gilleland,
School of Journalism
(College of Arts and Sciences)

LN: Modern Languages

Consultant: Prof. Holbrook Robinson,
Chair, Modern Languages Dept.
(College of Arts and Sciences)

Modern Languages includes the following:

LNF: French	LNJ: Japanese
LNG: German	LNN: Swedish
LNI: Italian	LNR: Russian
	LNS: Spanish

MUS: Music

Consultant: Prof. Joshua R. Jacobson,
Music Dept. (College of Arts and Sciences)
Associate Consultant/Program Advisor:
Marjorie Atlas, Music Dept.
(College of Arts and Sciences)

PHL: Philosophy and Religion

Consultant: Prof. Susan Setta,
Chair, Philosophy Dept.
(College of Arts and Sciences)

POL: Political Science

Consultant: Prof. L. Gerald Bursey,
Political Science Dept.
(College of Arts and Sciences)

PSY: Psychology

Consultant/Program Advisor:
Prof. Charles Karis, Psychology Dept.
(College of Arts and Sciences)
Associate Consultant:
Prof. Harold Zamansky, Psychology Dept.
(College of Arts and Sciences)

SOA: Sociology-Anthropology and

SOC: Sociology

Consultant: Prof. Christine Gailey,
Sociology Dept. (College of Arts and Sciences)
Associate Consultant/Program Advisor:
Prof. Elliott Krause, Sociology Dept.
(College of Arts and Sciences)

TCC: Technical Communications

Consultant/Program Advisor:
Neil F. Duane (President, Boston
Documentation Design)

Purpose

Through the liberal arts curricula offered by University College, students are guided in their independent and creative discovery of ideas and methods in the areas of humanities, natural sciences, and social sciences.

University College holds that a liberal arts education enables students to make more intelligent and realistic appraisals of self and career. The Liberal Arts Programs at the college present students with both a challenge to bring meaning and focus to the educational experience and an opportunity to acquire marketable knowledge and skills. As the president of a large corporation put it, "It is no longer enough for management to be well-trained rather than well-educated."

Programs

University College offers bachelor of arts and bachelor of science degrees in art, economics, English, history, political science, psychology, and sociology-anthropology. Unlike the bachelor of science degree, the bachelor of arts degree includes a language requirement. Bachelor of science degrees are offered in graphic design and visual communication, in technical communications, and in the popular combined program, Liberal Arts/Business Minor. In addition, degree programs in English, political science, and sociology-anthropology present professional concentrations designed to teach specialized skills.

Liberal Arts bachelor's degree candidates are permitted to accumulate up to 44 quarter hours of credit (25 percent of the credits toward a bachelor's degree) in business subjects.

Bachelor's Degree in Liberal Studies

University College offers a bachelor of arts degree in liberal studies designed to help students develop communication, analytical, and research skills while exploring the great ideas of the ages as well as contemporary issues. The program's courses are grouped in four areas:

- Communication and Critical Thinking
- Cultural Heritage
- Science, Research, and Quantitative Methods
- Contemporary Studies.

The courses in each area are selected to provide students with a breadth of disciplinary perspectives.

Forty-five quarter hours of elective credits are permitted to allow students to take a certificate program or select individual courses in accordance with their personal and career interests.

Upon approaching completion of individual coursework in Cultural Heritage and Contemporary Studies, students take an interdisciplinary seminar in each area to integrate their learning experiences.

Associate in Science Degree

An associate in science degree program in arts and sciences is offered for those who want a general background in liberal arts, but who do not want to pursue a major field of concentration for the bachelor's degree. (Students who do wish to go on to a bachelor's degree should check with an academic advisor to be sure that the courses they select for the A.S. degree will fit into their chosen bachelor's program.)

Certificate Programs

Students who seek specialized skills to advance their careers may choose from the following liberal arts certificate programs, which they may take independently or in conjunction with degree study:

- acting 39
- advertising 40
- American Sign Language and deaf studies 40
- American Sign Language-English interpreting 59
- business communication 41
- communication studies 42
- computer graphic design 43
- electronic composition 46
- graphic design and visual communication 48
- public relations 53
- technical writing 55
- writing 56

Special Studies

University College offers a variety of Special Studies. These courses give students an opportunity to earn credits in Advanced Tutorials, Independent Studies, Honors Programs, and Field Work. Consult descriptions on page 23.

Assessment of Prior Learning Program (APL)

Some students may petition for prior learning or life experience credit, in specified liberal arts, health, and business subjects. See page 27 for details. Credit cannot be awarded through APL when an appropriate examination is available through CLEP or PEP.

Degrees

Arts and Sciences Associate in Science Degree (Major Code 372)



Core Courses		quarter hours
ENG 4100	Critical Writing 1	4
ENG 4111 ENG 4112	Critical Writing 2, 3	6
Major Concentration Courses		
Humanities (AFR 4151, ART, ASL, CMN, DRA, ENG, JRN, LN, MUS, PHL, TCC)		24
Math-Science (BIO, CHM, ESC, MTH, PHY)		18
Social Sciences (AFR 4131, AFR 4132, AFR 4193, ECN, HST, POL, PSY, SOA, SOC)		24
Electives*		20
Total Quarter Hours		96

*Recommended: INT 4110 *Managing Career Decisions*, and INT 4200 *Workshop in Creativity* (see page 207 for course descriptions).

Economics Bachelor of Arts Degree (Major Code 390)



Core Courses

	quarter hours
ENG 4100	Critical Writing 1 4
ENG 4111 ENG 4112	Critical Writing 2, 3 6
MTH 4110 MTH 4111	Contemporary Algebra 1, 2 6
Modern Language	Conversational 12
	Intermediate 12
Humanities (AFR 4151, ART, ASL, CMN, DRA, ENG, JRN, LN, MUS, PHL, TCC)	24
Math-Science (BIO, CHM, ESC, MTH, PHY)	12
Social Sciences (AFR 4131, AFR 4132, AFR 4193, HST, POL, PSY, SOA, SOC)	18

Major Concentration Courses

ECN 4115 ECN 4116 ECN 4117	Economic Principles & Problems 1, 2, 3 9
ECN 4137	History of Economic Thought 3
ECN 4215 ECN 4217	Macroeconomic Theory 1, 2 6
ECN 4216 ECN 4218	Microeconomic Theory 1, 2 6
ECN 4250 ECN 4251 ECN 4252	Statistics 1, 2, 3 9

Electives

Economics	24
Open electives*	23

Total Quarter Hours 174

*Recommended: INT 4110 *Managing Career Decisions* and INT 4200 *Workshop in Creativity* (see page 207 for course descriptions).

Economics Bachelor of Science Degree with Certificate in Finance (Major Code 390)



Core Courses

	quarter hours
ENG 4100	Critical Writing 1 4
ENG 4111 ENG 4112	Critical Writing 2, 3 6
MTH 4110 MTH 4111	Contemporary Algebra 1, 2 6
Social Sciences (AFR 4131, AFR 4132, AFR 4193, HST, POL, PSY, SOA, SOC)	12

Major Concentration Courses

ECN 4115 ECN 4116 ECN 4117	Economic Principles & Problems 1, 2, 3 9
ECN 4137	History of Economic Thought 3
ECN 4215 ECN 4217	Macroeconomic Theory 1, 2 6
ECN 4216 ECN 4218	Microeconomic Theory 1, 2 6
ECN 4250 ECN 4251 ECN 4252	Statistics 1, 2, 3 9

Finance Certificate Courses

ACC 4101 ACC 4102 ACC 4103	Accounting Principles 1, 2, 3 9
FI 4301	Principles of Finance 3
FI 4302	Financial Management 3
FI 4310	Investment Principles 3
FI 4320	Credit Principles 3
FI 4325	Budgeting and Planning 3

Electives

Economics	24
Liberal Arts	42
Open electives* †	23

Total Quarter Hours 174

*Up to 20 q.h. allowed in business subjects.

†Recommended: INT 4110 *Managing Career Decisions*, and INT 4200 *Workshop in Creativity* (see page 207 for course descriptions).

English Bachelor of Arts Degree (Major Code 330)



quarter hours

Core Courses

ENG 4100	Critical Writing 1	4
ENG 4111 ENG 4112	Critical Writing 2, 3	6
Modern Language	Conversational	12
	Intermediate	12
Math-Science (BIO, CHM, ESC, MTH, PHY)		18
Social Sciences (AFR 4131, AFR 4132, AFR 4193, ECN, HST, POL, PSY, SOA, SOC)		24

Major Concentration Courses

ENG 4120	English Literature: Faith and Humanism	3
ENG 4121	English Literature: Reason and Romanticism	3
ENG 4122	English Literature: Victorians and Moderns	3
ENG 4123	Early American Literature: Faith, Reason, and Nature	3
ENG 4124	American Romantics and American Realists	3
ENG 4125	American Literature: The Modern Temper	3
ENG 4131	God, Gods, and Heroes: The Literature of the Ancient and Medieval Worlds	3
ENG 4132	Man, Reason, and Imagination: Literature from the Renaissance to the Romantic Age	3
ENG 4133	Order and Disorder: Literature of the Moderns	3
ENG 4349 ENG 4350	Expository and Persuasive Writing 1, 2	6
ENG 4352	Expository Communications	3
ENG 4604	Major Figure in Literature*	6
ENG 4658	Shakespeare the Dramatist	(3)
or	or	
ENG 4659	Shakespeare: The Major Tragedies and Comedies	(3)
or	or	
ENG 4660	Shakespeare on Film†	(3)

Choose one of two concentrations for twenty-seven quarter hours:

I. Literature

Select nine courses from the ENG 4200 or ENG 4600 series in the course descriptions on pages 183-187. (27)

II. Writing

Choose six courses from the ENG 4300 or ENG 4500 series in the course descriptions on pages 184-186, or ENG 4242, ENG 4243, and three courses from either the JRN or TCC courses on pages 208-209 and 253-255. (27)

Electives

English (ENG 4200 and up)	9
Open electives**	17

Total Quarter Hours 174

*Course must be taken twice, focusing on a different figure each time.

**Recommended: INT 4200 *Workshop in Creativity* and INT 4110 *Managing Career Decisions* (see page 207 for course descriptions).

†Special fee, see page 259.

English Bachelor of Science Degree (Major Code 330)



Core Courses

	quarter hours
ENG 4100	Critical Writing 1 4
ENG 4111 ENG 4112	Critical Writing 2, 3 6
Math-Science (BIO, CHM, ESC, MTH, PHY)	18
Social Sciences (AFR 4131, AFR 4132, AFR 4193, ECN, HST, POL, PSY, SOA, SOC)	24

Major Concentration Courses

ENG 4120	English Literature: Faith and Humanism	3
ENG 4121	English Literature: Reason and Romanticism	3
ENG 4122	English Literature: Victorians and Moderns	3
ENG 4123	Early American Literature: Faith, Reason, and Nature	3
ENG 4124	American Romantics and American Realists	3
ENG 4125	American Literature: The Modern Temper	3
ENG 4131	God, Gods, and Heroes: The Literature of the Ancient and Medieval Worlds	3
ENG 4132	Man, Reason, and Imagination: Literature from the Renaissance to the Romantic Age	3
ENG 4133	Order and Disorder: Literature of the Moderns	3
ENG 4349 ENG 4350	Expository and Persuasive Writing 1, 2	6
ENG 4352	Expository Communications	3
ENG 4604	Major Figure in Literature*	6
ENG 4658	Shakespeare the Dramatist	(3)
or	or	
ENG 4659	Shakespeare: The Major Tragedies and Comedies	(3)
or	or	
ENG 4660	Shakespeare on Film†	(3)

Choose one of two concentrations for twenty-seven quarter hours:

I. Literature

Choose nine courses from the ENG 4200 or ENG 4600 series in the course descriptions on pages 183-187. (27)

II. Writing

Select six courses from the ENG 4300 or ENG 4500 series in the course descriptions on pages 184-186, or ENG 4242, ENG 4243, and three courses from either the JRN or TCC courses on pages 208-209 and 253-255. (27)

Electives

English (ENG 4200 and up)	9
Open electives**	41

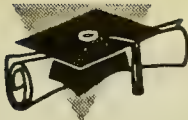
Total Quarter Hours 174

*Course must be taken twice, focusing on a different figure each time.

**Recommended: INT 4200 *Workshop in Creativity* and INT 4110 *Managing Career Decisions* (see page 207 for course descriptions).

†Special fee, see page 259.

Fine Arts Bachelor of Arts Degree (Major Code 327)



Core Courses

ENG 4100	Critical Writing 1	4
ENG 4111 ENG 4112	Critical Writing 2, 3	6
Modern Language	Conversational	12
	Intermediate	12
Math-Science (BIO, CHM, ESC, MTH, PHY)		18
Social Sciences (AFR 4131, AFR 4132, AFR 4193, ECN, HST, POL, PSY, SOA, SOC)		24

Major Concentration Courses

ART 4100	History of Art to the Fourth Century	3
ART 4101	History of Art to the Sixteenth Century	3
ART 4102	History of Art to the Twentieth Century	3
ART 4106	Introduction to Art	3
ART 4112	Visual Foundations*	3

Electives

Art	36
Open electives**†	47

Total Quarter Hours 174

*3 1/2-hour studio. Special fee, see page 259.

**Up to 44 q.h. allowed in business subjects.

†Recommended: INT 4200 *Workshop in Creativity* and INT 4110 *Managing Career Decisions* (see page 207 for course descriptions).

Fine Arts Bachelor of Science Degree (Major Code 327)



Core Courses

ENG 4100	Critical Writing 1	4
ENG 4111 ENG 4112	Critical Writing 2, 3	6
Math-Science (BIO, CHM, ESC, MTH, PHY)		18
Social Sciences (AFR 4131, AFR 4132, AFR 4193, ECN, HST, POL, PSY, SOA, SOC)		24

Major Concentration Courses

ART 4100	History of Art to the Fourth Century	3
ART 4101	History of Art to the Sixteenth Century	3
ART 4102	History of Art to the Twentieth Century	3
ART 4106	Introduction to Art	3
ART 4112	Visual Foundations*	3

Electives

Art	36
Open electives**†	71

Total Quarter Hours 174

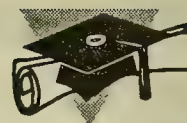
*3 1/2-hour studio. Special fee, see page 259.

**Up to 44 q.h. allowed in business subjects.

†Recommended: INT 4200 *Workshop in Creativity* and INT 4110 *Managing Career Decisions* (see page 207 for course descriptions).

Graphic Design and Visual Communication

Associate in Science Degree (Major Code 362)



Core Courses

Communication

ENG 4100

ENG 4111 ENG 4112

CMN 4101

PHL 4100

Critical Writing 1

Critical Writing 2, 3

Fundamentals of Human
Communication

Philosophical Thinking

quarter hours

4

6

3

3

Social Sciences

HST 4101

HST 4102

HST 4103

SOC 4100

SOC 4101

The Civilization of the Ancient
and Medieval Worlds

The Civilization of the Early
Modern World

The Civilization of the Modern World

Roles, Culture, and the Individual

Inequality and Institutions

3

3

3

3

3

Business

MGT 4101

MKT 4301

ACC 4101

Introduction to Business and
Management 1

Introduction to Marketing 1

Accounting Principles 1

3

3

3

Major Concentration Courses

Art/Graphics

ART 4105

ART 4110

ART 4112

ART 4121

ART 4175

Art through the Ages

Modern Art

Visual Foundations*

Principles of Drawing and
Composition*

History of Graphic Design

3

3

3

3

3

Graphic Design and Visual Communication Certificate

ART 4135

ART 4139

ART 4140

ART 4141

ART 4142

ART 4143

ART 4151

ART 4181

ART 4367

ART 4251

Design Fundamentals*

Color Theory and Practice*

Graphic Communication and
Production

Graphic Design 1*, 2*

Advertising Design*

Typography

Introduction to Computer Graphics*

Pictorial Imagery for the
Graphic Designer*

Portfolio Development*

3

3

3

6

3

3

3

3

3

Open Electives**

11

Total Quarter Hours

96

*3 1/2-hour studio. Special fee, see page 259.

**Recommended: INT 4200 *Workshop in Creativity* and INT 4110 *Managing Career Decisions* (see page 207 for course descriptions).

Graphic Design and Visual Communication Bachelor of Science Degree (Major Code 360)



Core Courses

quarter hours

Credits from associate in science degree in graphic design and visual communication 96

Business Communication and Research

ENG 4380	ENG 4381	Business Writing and Reports 1, 2	6
CMN 4251		Business and Professional Speaking	3
ECN 4115		Economic Principles and Problems 1	3
MGT 4330		Essentials for Managers of Small Businesses	3

Computer, Math, Science

COM 4101			Foundations of Computer Literacy	4
MTH 4110	MTH 4111	MTH 4112	Contemporary Algebra 1, 2, 3	9

Choose one of the following pairs:

BIO 4103	BIO 4104	Biology 1, 2	(6)
or		or	
CHM 4111	CHM 4112	General Chemistry 1, 2	(6)
or		or	
ESC 4103		Introduction to the Earth Sciences: The Solid Earth	(3)
ESC 4104		Introduction to the Earth Sciences: Earth's Oceans and Atmosphere	(3)
or		or	
PHY 4101	PHY 4102	College Physics 1, 2**	(8)

Major Concentration Courses

ART 4160	Basic Photography*	3
ART 4176	International Directions in Graphic Design	3
ART 4183	Electronic Publishing Design*	3
ART 4184	Presentation Graphics*	3
ART 4185	Creative Imaging: Custom Computer Design*	3
ART 4187	Advanced Computer Illustration*	3
ART 4188	Advanced Raster Graphics*	3
ART 4366	Promotional and Technical Publications: Design and Production*	3
ART 4186	Computer Graphics Design Portfolio*	3

Electives** 18

Total Quarter Hours 175-177

*3 1/2-hour studio or lab. Special fee, see page 259.

**Physics and additional courses in humanities are recommended, as well as INT 4200 *Workshop in Creativity* and INT 4110 *Managing Career Decisions* (see page 207 for course descriptions).

History Bachelor of Arts Degree (Major Code 323)



Core Courses

	quarter hours
ENG 4100	Critical Writing 1 4
ENG 4111	Critical Writing 2, 3 6
ENG 4112	Conversational 12
Modern Language	Intermediate 12
Humanities (AFR 4151, ART, ASL, CMN, DRA, ENG, JRN, LN, MUS, PHL, TCC)	24
Math-Science (BIO, CHM, ESC, MTH, PHY)	18
Social Sciences (in three of the following areas: ECN, POL, PSY, SOA, SOC)	18

Major Concentration Courses

Introductory Courses

HST 4101	The Civilization of the Ancient and Medieval Worlds	3
HST 4102	The Civilization of the Early Modern World	3
HST 4103	The Civilization of the Modern World	3
HST 4201	American History 1763-1848	3
HST 4202	American History 1848-1917	3
HST 4203	American History Since 1917	3

Historical Skill Requirement

HST 4241	The Historian's Craft	3
HST 4265	Introduction to Public History	3

Regional Distribution

Choose one course from each of the following three regional groupings:

European: any course with a HST 44 prefix	3
American: any course with a HST 45 prefix	3
Other: any course with a HST 46 prefix	3

Thematic Distribution

Choose four courses from one of the following groups A-E, or choose Group F:

Group A: America's Ethnic Roots (HST 4404, 4434, 4435, 4455, 4466, 4501, 4543, 4544, 4602, 4604, 4611, 4632, 4636)	(12)
Group B: America's Social and Economic History (HST 4530, 4532, 4533, 4534, 4535, 4536, 4537, 4540, 4542, 4544, 4546, 4547, 4548)	(12)
Group C: Contemporary History (HST 4424, 4425, 4460, 4468, 4513, 4532, 4533, 4534, 4535, 4536, 4537, 4549, 4602, 4603, 4611, 4622, 4623, 4624, 4643, 4644, 4645, 4646)	(12)
Group D: Technological History (HST 4270, 4301, 4302, 4303, 4304, 4535, 4536, 4537, 4643)	(12)
Group E: Women and Family History (HST 4434, 4435, 4540, 4542, 4640)	(12)
Group F: Honors (HST 4811, 4812, 4813)	(12)

Electives*	35
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Total Quarter Hours	174
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*Recommended: INT 4110 *Managing Career Decisions* and INT 4200 *Workshop in Creativity* (see page 207 for course descriptions).

History Bachelor of Science Degree (Major Code 323)



Core Courses

ENG 4100			Critical Writing 1	4
ENG 4111	ENG 4112		Critical Writing 2, 3	6
MIS 4101	MIS 4102		Introduction to Data Processing and Information Systems 1, 2	6
SOC 4331	SOC 4332	SOC 4333	Social Research Methods 1, 2, 3	9
Humanities (AFR 4151, ART, ASL, CMN, DRA, ENG, JRN, LN, MUS, PHL, TCC)				24

Social Sciences

Choose two groups (three courses in each group) from the following:

ECN 4115 ECN 4116 ECN 4117	Economic Principles and Problems 1, 2, 3	(9)
or	or	
POL 4103	Introduction to Politics	(3)
POL 4104	Introduction to American Government	(3)
POL 4105	Introduction to Comparative Politics	(3)
or	or	
PSY 4110	Introduction to Psychology: Fundamental Issues	(3)
PSY 4111	Introduction to Psychology: Developmental Aspects	(3)
PSY 4112	Introduction to Psychology: Personal Dynamics	(3)
or	or	
SOA 4100	Physical Anthropology	(3)
SOA 4101	Cultural Anthropology: Kinship Societies	(3)
SOA 4102	Cultural Anthropology: State Societies	(3)
or	or	
SOC 4100	Roles, Culture, and the Individual	(3)
SOC 4101	Inequality and Institutions	(3)
SOC 4102	Institutions and Social Change	(3)

Major Concentration Courses

Introductory Courses

HST 4101	The Civilization of the Ancient and Medieval Worlds	3
HST 4102	The Civilization of the Early Modern World	3
HST 4103	The Civilization of the Modern World	3
HST 4201	American History 1764-1848	3
HST 4202	American History 1848-1917	3
HST 4203	American History Since 1917	3

Historical Skill Requirement

HST 4241	The Historian's Craft	3
HST 4263	Oral History	3
HST 4265	Introduction to Public History	3
HST 4821	Field Work in History (or related APL credit)	6

Regional Distribution

Choose one course from each of the following regional groupings:

European: any course with a HST 44 prefix	3
American: any course with a HST 45 prefix	3
Other: any course with a HST 46 prefix	3



Thematic Distribution

Choose four courses from one of the following groups A-E, or choose Group F:

- Group A: America's Ethnic Roots (HST 4404, 4434, 4435, 4455, 4466, 4501, 4543, 4544, 4602, 4604, 4611, 4632, 4636) (12)
- Group B: America's Social and Economic History (HST 4530, 4532, 4533, 4534, 4535, 4536, 4537, 4540, 4542, 4544, 4546, 4547, 4548) (12)
- Group C: Contemporary History (HST 4424, 4425, 4460, 4468, 4513, 4532, 4533, 4534, 4535, 4536, 4537, 4549, 4602, 4603, 4611, 4622, 4623, 4624, 4643, 4644, 4645, 4646) (12)
- Group D: Technological History (HST 4270, 4301, 4302, 4303, 4304, 4535, 4536, 4537, 4643) (12)
- Group E: Women and Family History (HST 4434, 4435, 4540, 4542, 4640) (12)
- Group F: Honors (HST 4811, 4812, 4813) (12)

Electives (preferably other than history)*† 53

Total Quarter Hours 174

*Up to 44 q.h. allowed in business subjects.

†Recommended: INT 4110 *Managing Career Decisions* and INT 4200 *Workshop in Creativity* (see page 207 for course descriptions).

Liberal Arts/Business Minor Bachelor of Science Degree (Major Code 373)



Basic Courses

			quarter hours
ENG 4100		Critical Writing 1	4
ENG 4111	ENG 4112	Critical Writing 2, 3	6
ENG 4380	ENG 4381	Business Writing and Reports 1, 2	6
MTH 4110	MTH 4111	Contemporary Algebra 1, 2, 3	9
PSY 4110		Introduction to Psychology: Fundamental Issues	3
PSY 4111		Introduction to Psychology: Developmental Aspects	3
PSY 4112		Introduction to Psychology: Personal Dynamics	3
ECN 4115	ECN 4116	Economic Principles and Problems 1, 2, 3	9
	ECN 4117		

Core Courses--Liberal Arts

SOC 4100	Roles, Culture, and The Individual	3
SOC 4101	Inequality and Institutions	3
SOC 4102	Institutions and Social Change	3
POL 4103	Introduction to Politics	3
POL 4104	Introduction to American Government	3
POL 4105	Introduction to Comparative Politics	3

Choose 6 courses from:

HST 4101	The Civilization of the Ancient and Medieval Worlds	(3)
HST 4102	The Civilization of the Early Modern World	(3)
HST 4103	The Civilization of the Modern World	(3)
HST 4201	American History 1763-1848	(3)
HST 4202	American History 1848-1917	(3)
HST 4203	American History Since 1917	(3)
or	or	
any HST course with a 46 prefix (international history)		(3)

PHL 4100	Philosophical Thinking	3
PHL 4200	Logic	3
PHL 4180	Business Ethics	3
ECN 4250	Statistics 1, 2, 3	9
ECN 4251		
ECN 4252		

Core Courses--Business Administration

ACC 4101	ACC 4102	ACC 4103	Accounting Principles 1, 2, 3	9
BL 4101	BL 4102		Law 1, 2	6
FI 4301			Principles of Finance	3
FI 4302			Financial Management	3
HRM 4301			Organizational Behavior 1	3
HRM 4302			Organizational Behavior 2	3
MGT 4101	MGT 4102	MGT 4103	Introduction to Business and Management 1, 2, 3	9
MGT 4446			International Business	3
MIS 4101	MIS 4102		Introduction to Data Processing and Information Systems 1, 2	6
MIS 4221			COBOL Programming 1	3
MKT 4301			Introduction to Marketing 1	3



Electives

Fine Arts: Art, Music, or Drama

6

Literature/Writing: Select 2 courses from the ENG 4200, 4300, or 4600 series
(course descriptions, pp. 183-187)

6

Non-business electives*

14

Total Quarter Hours

174

*Recommended: INT 4200 *Workshop in Creativity* and INT 4110 *Managing Career Decisions* (see page 207 for course descriptions).

Liberal Studies Bachelor of Arts Degree (Major Code 495)



Core Courses

quarter hours

Communication and Critical Thinking

ENG 4100		Critical Writing 1	4
ENG 4111	ENG 4112	Critical Writing 2, 3	6
INT 4200		Workshop in Creativity	3
PHL 4100		Philosophical Thinking	3
PHL 4105		Philosophy of Knowing and Reality	3
PHL 4200		Logic	3
CMN 4101		Fundamentals of Human Communication	3
CMN 4102		Group Discussion	3
Communication Studies (any CMN course)			3

Cultural Heritage

ART 4105		Art through the Ages	3
ECN 4137		History of Economic Thought	3
ENG 4131		God, Gods, and Heroes: Literature of the Ancient and Medieval Worlds	3
ENG 4132		Man, Reason, and Imagination: Literature from the Renaissance to the Romantic Age	3
ENG 4133		Order and Disorder: Literature of the Moderns	3
HST 4101		The Civilization of the Ancient and Medieval Worlds	3
HST 4102		The Civilization of the Early Modern World	3
HST 4103		The Civilization of the Modern World	3
INT 4203		Independent Study in Cultural Heritage	3
MUS 4120		Music Appreciation: The Masterworks of Western Civilization	3
POL 4110		The Great Political Thinkers	3

Science, Research, and Quantitative Methods

CHM 4105		Chemistry and the Environment	3
ECN 4250	ECN 4251	Statistics 1, 2	6
ENG 4381		Business Writing and Reports 2	3
MIS 4101	MIS 4102	Introduction to Data Processing and Information Systems 1, 2	6
MTH 4110	MTH 4111	Contemporary Algebra 1, 2, 3	9
MTH 4112			6
Science (BIO, CHM, ESC, PHY)			

Contemporary Studies

ECN 4115	ECN 4116	Economic Principles and Problems 1, 2	6
ECN 4334		Comparative Economic Systems	3
INT 4204		Independent Study in Contemporary Studies	3
POL 4105		Introduction to Comparative Politics	3
PSY 4110		Introduction to Psychology: Fundamental Issues	3
Psychology (any PSY course)			3
SOA 4155		Individual and Culture	3
SOC 4100		Roles, Culture, and the Individual	3
Sociology (any two SOC courses)			6



Electives*† 44

Electives may be used

- to take a University College certificate program
- to study a modern language or other area in greater depth
- to study areas of personal or career interest.

Students are encouraged to make an appointment with a University College counselor for help in selecting electives. Call 617-373-2400 or TTY 617-373-2825 for an appointment.

Total Quarter Hours 174

*Up to 44 q.h. allowed in business subjects.

†Recommended: INT 4110 *Managing Career Decisions* (see page 207 for course description).

Political Science Bachelor of Arts Degree (Major Code 322)



Core Courses		quarter hours
ENG 4100	Critical Writing 1	4
ENG 4111 ENG 4112	Critical Writing 2, 3	6
Modern Language	Conversational	12
	Intermediate	12
Humanities (AFR 4151, ART, ASL, CMN, DRA, ENG, JRN, LN, MUS, PHL, TCC)		24
Math-Science (BIO, CHM, ESC, MTH, PHY)		18
Social Sciences (in three of the following areas: ECN, HST, PSY, SOA, SOC)		18

Major Concentration Courses

POL 4103	Introduction to Politics	3
POL 4104	Introduction to American Government	3
POL 4105	Introduction to Comparative Politics	3
POL 4331	International Relations	3
POL 4370	Introduction to Political Theory	3

American Government

Choose three of the following:

POL 4310	American Political Thought	(3)
POL 4313	State and Local Government	(3)
POL 4314	Urban and Metropolitan Government	(3)
POL 4318	The American Presidency	(3)
POL 4319	The Legislative Process	(3)
POL 4320	American Constitutional Law	(3)
POL 4321	Civil Liberties	(3)
POL 4322	Criminal and Civil Due Process	(3)

Comparative Government

Choose two of the following:

POL 4330	Comparative Politics	(3)
POL 4338	European Political Parties	(3)
POL 4339	Government and Politics in the Soviet Union (Commonwealth of Independent States)	(3)
POL 4342	Eastern Europe in Transition	(3)
POL 4350	Politics and Policies of the Developing Nations	(3)
POL 4352	Government and Politics of Latin America	(3)
POL 4356	Government and Politics of Northern Africa	(3)
POL 4357	Government and Politics of South Africa	(3)
POL 4359	Government and Politics in the Middle East	(3)
POL 4362	Government and Politics of Southeast Asia	(3)
POL 4365	Government and Politics of China	(3)
POL 4367	Government and Politics of Japan	(3)

International Relations

Choose one of the following:

POL 4332	International Organization	(3)
POL 4333	International Law	(3)
POL 4335	Formulating American Foreign Policy	(3)
POL 4336	American Foreign Policy	(3)
POL 4341	Soviet Foreign Policy	(3)
POL 4364	China's Foreign Policy	(3)



Theory and Methodology

Choose one of the following:

POL 4311

Research Methods (3)

POL 4371

Modern Political Theory (3)

Electives

Political science 18

Open electives* 26

Total Quarter Hours

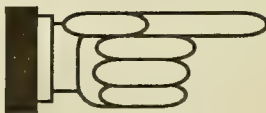
174

*Recommended: INT 4110 *Managing Career Decisions* and INT 4200 *Workshop in Creativity* (see page 207 for course descriptions).

Political Science Bachelor of Science Degree (Major Code 322)



Core Courses		quarter hours
ENG 4100	Critical Writing 1	4
ENG 4111 ENG 4112	Critical Writing 2, 3	6
ECN 4250 ECN 4251	Statistics 1, 2	6
MIS 4101 MIS 4102	Introduction to Data Processing and Information Systems 1, 2	6
Humanities (AFR 4151, ART, ASL, CMN, DRA, ENG, JRN, LN, MUS, PHL, TCC)		12
Social Sciences (in three of the following areas: ECN, HST, PSY, SOA, SOC)		18
<i>Choose one of the following:</i>		
MIS 4221	COBOL Programming 1	(3)
MIS 4241	Programming in BASIC 1	(3)
MIS 4276	Programming in C 1	(3)
Major Concentration Courses		
POL 4103	Introduction to Politics	3
POL 4104	Introduction to American Government	3
POL 4105	Introduction to Comparative Politics	3
POL 4331	International Relations	3
POL 4370	Introduction to Political Theory	3
American Government		
<i>Choose three of the following:</i>		
POL 4310	American Political Thought	(3)
POL 4313	State and Local Government	(3)
POL 4314	Urban and Metropolitan Government	(3)
POL 4318	The American Presidency	(3)
POL 4319	The Legislative Process	(3)
POL 4320	American Constitutional Law	(3)
POL 4321	Civil Liberties	(3)
POL 4322	Criminal and Civil Due Process	(3)
Comparative Government		
<i>Choose two of the following:</i>		
POL 4330	Comparative Politics	(3)
POL 4338	European Political Parties	(3)
POL 4339	Government and Politics in the Soviet Union (Commonwealth of Independent States)	(3)
POL 4342	Eastern Europe in Transition	(3)
POL 4350	Politics and Policies of the Developing Nations	(3)
POL 4352	Government and Politics of Latin America	(3)
POL 4356	Government and Politics of Northern Africa	(3)
POL 4357	Government and Politics of South Africa	(3)
POL 4359	Government and Politics in the Middle East	(3)
POL 4362	Government and Politics of Southeast Asia	(3)
POL 4365	Government and Politics of China	(3)
POL 4367	Government and Politics of Japan	(3)



International Relations

Choose one of the following:

POL 4332

POL 4333

POL 4335

POL 4336

POL 4341

POL 4364

International Organization (3)

International Law (3)

Formulating American Foreign Policy (3)

American Foreign Policy (3)

Soviet Foreign Policy (3)

China's Foreign Policy (3)

Theory and Methodology

Choose one of the following:

POL 4311

POL 4371

Research Methods (3)

Modern Political Theory (3)

Electives

Political science 18

Open electives*† 65

Total Quarter Hours

174

*Up to 44 q.h. allowed in business subjects.

†Recommended: INT 4110 *Managing Career Decisions* and INT 4200 *Workshop in Creativity* (see page 207 for course descriptions).



Psychology Bachelor of Arts Degree (Major Code 319)

Core Courses

	quarter hours
ENG 4100	Critical Writing 1 4
ENG 4111 ENG 4112	Critical Writing 2, 3 6
Modern Language	Conversational 12
	Intermediate 12
Humanities (AFR 4151, ART, ASL, CMN, DRA, ENG, JRN, LN, MUS, PHL, TCC)	24
Math-Science (BIO, CHM, ESC, MTH, PHY)	18
Social Sciences (in three of the following areas: ECN, HST, POL, SOA, SOC)	18

Major Concentration Courses

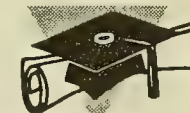
PSY 4110	Introduction to Psychology: Fundamental Issues	3
PSY 4111	Introduction to Psychology: Developmental Aspects	3
PSY 4112	Introduction to Psychology: Personal Dynamics	3
PSY 4220 PSY 4221 PSY 4222	Statistics in Psychology 1, 2, 3	9
PSY 4231	Psychology of Learning	3
PSY 4272	Personality	3
PSY 4351	Physiological Psychology	3
PSY 4381	Sensation and Perception	3
PSY 4561 PSY 4562 PSY 4563	Experimental Psychology 1, 2, 3	9
PSY 4611	Senior Seminar in Psychology	3

Electives

Psychology	18
Open electives *	20

Total Quarter Hours 174

*Recommended: INT 4110 *Managing Career Decisions* and INT 4200 *Workshop in Creativity* (see page 207 for course descriptions).



Psychology Bachelor of Science Degree (Major Code 319)

Core Courses

	quarter hours
ENG 4100	Critical Writing 1 4
ENG 4111 ENG 4112	Critical Writing 2, 3 6
Math-Science (BIO, CHM, ESC, MTH, PHY)	30

Major Concentration Courses

PSY 4110	Introduction to Psychology: Fundamental Issues	3
PSY 4111	Introduction to Psychology: Developmental Aspects	3
PSY 4112	Introduction to Psychology: Personal Dynamics	3
PSY 4220 PSY 4221 PSY 4222	Statistics in Psychology 1, 2, 3	9
PSY 4231	Psychology of Learning	3
PSY 4272	Personality	3
PSY 4351	Physiological Psychology	3
PSY 4381	Sensation and Perception	3
PSY 4561 PSY 4562 PSY 4563	Experimental Psychology 1, 2, 3	9
PSY 4611	Senior Seminar in Psychology	3

Electives

Psychology	18
Open electives*†	74

Total Quarter Hours 174

*Up to 44 q.h. allowed in business subjects.

†Recommended: INT 4110 *Managing Career Decisions* and INT 4200 *Workshop in Creativity* (see page 207 for course descriptions).

Sociology-Anthropology Bachelor of Arts Degree (Major Code 321)



Core Courses			quarter hours
ENG 4100		Critical Writing 1	4
ENG 4111	ENG 4112	Critical Writing 2, 3	6
Modern Language		Conversational	12
		Intermediate	12
Humanities (AFR 4151, ART, ASL, CMN, DRA, ENG, JRN, LN, MUS, PHL, TCC)			24
Math-Science (BIO, CHM, ESC, MTH, PHY)			18
Social Sciences (in three of the following areas: ECN, HST, POL, PSY)			18
Major Concentration Courses			
SOA 4100		Physical Anthropology	3
SOA 4101		Cultural Anthropology:	
		Kinship Societies	3
SOA 4102		Cultural Anthropology: State Societies	3
SOC 4100		Roles, Culture, and the Individual	3
SOC 4101		Inequality and Institutions	3
SOC 4102		Institutions and Social Change	3
SOC 4300	SOC 4301	SOC 4302	Social Theory 1, 2, 3
SOC 4331	SOC 4332	SOC 4333	Social Research Methods 1, 2, 3
Electives			
Sociology-Anthropology (at least nine quarter hours in SOA)			21
Open electives*			23
Total Quarter Hours			174

*Recommended: INT 4110 *Managing Career Decisions* and INT 4200 *Workshop in Creativity* (see page 207 for course descriptions).

Sociology-Anthropology Bachelor of Science Degree (Major Code 321)

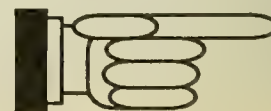


Core Courses			quarter hours
ENG 4100		Critical Writing 1	4
ENG 4111	ENG 4112	Critical Writing 2, 3	6
Social Sciences (AFR 4131, AFR 4132, AFR 4193, ECN, HST, POL, PSY)			18
Major Concentration Courses			
SOA 4100		Physical Anthropology	3
SOA 4101		Cultural Anthropology:	
		Kinship Societies	3
SOA 4102		Cultural Anthropology: State Societies	3
SOC 4100		Roles, Culture, and the Individual	3
SOC 4101		Inequality and Institutions	3
SOC 4102		Institutions and Social Change	3
SOC 4300	SOC 4301	SOC 4302	Social Theory 1, 2, 3
SOC 4331	SOC 4332	SOC 4333	Social Research Methods 1, 2, 3
Electives*			
Sociology-Anthropology (at least nine quarter hours in SOA)			39
Open electives (preferably in the humanities and math-science)**†			71
Total Quarter Hours			174

*Students may use these electives to take the Human Services Concentration.

**Up to 44 q.h. allowed in business subjects.

†Recommended: INT 4110 *Managing Career Decisions* and INT 4200 *Workshop in Creativity* (see page 207 for course descriptions).



Human Services Elective Concentration (open only to B.S. degree candidates)

				quarter hours
SOC 4125			Social Problems**	3
SOC 4240			Sociology of Human Service Organizations**	3
SOC 4241			Human Services Professions**	3
SOC 4245			Poverty and Inequality**	3
SOC 4260	SOC 4261	SOC 4262	Introduction to Social Work Practice 1, 2, 3**	9
PSY 4110			Introduction to Psychology: Fundamental Issues†	3
PSY 4111			Introduction to Psychology: Developmental Aspects†	3
PSY 4112			Introduction to Psychology: Personal Dynamics†	3
PSY 4372	PSY 4373	PSY 4374	Abnormal Psychology 1, 2, 3†	9
Total Quarter Hours				39

**SOC courses can be used for SOC electives for B.S. degree.
†PSY courses can be used for Social Science electives for B.S. degree.

Recommended Electives for Human Services Concentration Students

ECN 4130	Medical Economics	3
ECN 4311	Human Resource Planning	3
ECN 4315	Income Inequality and Discrimination	3
POL 4300	Introduction to Public Administration	3
POL 4301	Case Studies in Public Administration	3
POL 4306	Public Policy Analysis	3
POL 4321	Civil Liberties	3
PSY 4240	Development: Infancy and Childhood	3
PSY 4241	Development: Adolescence	3
PSY 4242	Development: Adulthood and Aging	3
PSY 4272	Personality	3
SOC 4170	Race and Ethnic Relations	3
SOC 4185	Deviant Behavior	3
SOC 4186	Social Control	3
SOC 4190	Juvenile Delinquency	3
SOC 4215	Medical Sociology	3
SOC 4225	Social Gerontology	3

Technical Communications Bachelor of Science Degree (Major Code 380)



Core Courses

quarter hours

Basic Communication

ENG 4100
ENG 4111 ENG 4112
ENG 4349 ENG 4350
ENG 4380 ENG 4381
ART 4140
JRN 4112
PHL 4100
PHL 4200
CMN 4152

Critical Writing 1 4
Critical Writing 2, 3 6
Expository and Persuasive Writing 1, 2 6
Business Writing and Reports 1, 2 6
Graphic Communication and Production 3
Writing for Media 1 3
Philosophical Thinking 3
Logic 3
Interviewing 3

Technology

COM 4104
MTH 4110
PHY 4101 PHY 4102
Choose one of the following:
MIS 4221
MIS 4241
MIS 4276

Computer Literacy 4
Contemporary Algebra 1 3
College Physics 1, 2 8

COBOL Programming 1 (3)
Programming in BASIC 1 (3)
Programming in C 1 (3)

Major Concentration Courses

TCC 4101 TCC 4102
TCC 4105
TCC 4340

Technical Writing 1, 2 6
Editing for Science and Technology 3
Documentation Development and Completion 3

Choose four of the following:

TCC 4110
TCC 4301 TCC 4302

TCC 4311 TCC 4312
TCC 4320
TCC 4330

Technical-Promotional Writing (3)
Computer Software Technical Writing 1, 2 (6)
Instruction Manual Writing 1, 2 (6)
Proposal Writing (3)
The Business and Technical Presentation (3)

Open Electives*†

95

The following electives are recommended:

ACC 4101 ACC 4102
ART 4366

ENG 4352
MGT 4101 MGT 4102

TCC 4805

Accounting Principles 1, 2 (6)
Promotional and Technical Publications: Design and Production** (3)
Expository Communications (3)
Introduction to Business and Management 1, 2 (6)
Field Work in Technical Communications (6)

Total Quarter Hours

174

*Up to 44 q.h. allowed in business subjects.

†Also recommended: INT 4110 *Managing Career Decisions* and INT 4200 *Workshop in Creativity* (see page 207 for course descriptions).

**Special fee, see page 259.

Alternative Freshman-Year Program

Richard Wilson, *Manager,
Alternative Freshman-Year Program*

Jennifer J. Wells, *Assistant to the Manager,
Alternative Freshman-Year Program*

249 Ryder Hall
617-373-4626

Program Goals

Students in the Alternative Freshman-Year Program are considered full-time day students and are degree candidates with an undeclared major. The program is designed to help students strengthen their basic skills in writing and mathematics, while helping them gain confidence in their ability to do college-level work. The program also offers students an opportunity to consider several areas of study before committing themselves to a specific major. Through the combination of a carefully prescribed curriculum and the attention of professional counselors, each student is helped to establish a program suited to his or her individual needs. These same counselors are normally available throughout the student's entire freshman year.

Program Structure

Students in the Alternative Freshman-Year Program normally take sixteen quarter hours of credit during each of their three freshman quarters, but may take 12 quarter hours during the first quarter and still be considered full-time students. Students in the health science track take a variety of course loads over three or four consecutive quarters, totalling from 48 to 59 quarter hours. When a fourth quarter is required, it is tuition-free.

After completing the prescribed Alternative Freshman-Year Program and achieving both a cumulative quality-point average of 1.400 or better and specific program requirements as noted, students may generally continue their degree programs by transferring with sophomore status, to any program in the College of Business Administration or the College of Criminal Justice, as well as most programs in the College of Arts and Sciences. Students may also continue their degree programs within University College. In addition to the cumulative quality-point average of 1.400 or better, the College of Business Administration requires a 1.800 average in 4 key courses, namely, MTH 1113, ENG 4014, ECN 4601, and MGT 4110. A higher cumulative grade average is also required for entrance into several majors in the College of Arts and Sciences, such as Art and Architecture (2.5), Journalism (2.25), and Speech Communication (2.5). AFY students entering the Bouvé School of Pharmacy and Health Sciences must complete 59 academic credits with a 3.0 GPA, including three chemistry, two biology, and two advanced math courses. Entrance to the School of Pharmacy is on a space-available basis.

Faculty and Resources

For the Alternative Freshman-Year Program, the University has carefully selected faculty members who are aware of the individual needs and goals of students working to adjust to a college program. Faculty and students meet in small classes of not more than twenty-five students.

As members of the program, students are considered regular Northeastern University day students even though they have unique schedules and a distinctively tailored curriculum. Therefore, they generally have access to all counseling services, physical education facilities, dormitory arrangements, and extracurricular programs at the University's main campus in Boston.

Alternative Freshman-Year students are encouraged to make extensive use of the up-to-date, programmed learning resources available for self-instruction through Northeastern's Learning Resources Center. For additional assistance, these students are also frequently referred to the Academic Assistance Center or the Math/Writing Center. A third and very important resource, the Counseling and Testing Center, is also available to students for personal and academic counseling as well as for vocational testing and counseling.

Tuition and Fees

Tuition and fees for the Alternative Freshman-Year Program are the same as for students in the Basic Day Colleges. Payment of the standard tuition during the first three academic quarters of residence entitles students to forty-eight credit hours of instruction. Thus, those who take the forty-four programmed credits are entitled to a four-quarter-hour tuition adjustment at the regular freshman rate.

Application Procedures

For more information on the Alternative Freshman-Year Program, or to request an application, write or call the Dean of Admissions, Department of Admissions, Northeastern University, 360 Huntington Avenue, Boston, MA 02115, 617-373-2200.

Sample One-Year Program Business Track

	quarter hours
Quarter 1	
ED 4003	Integrated Language Skills A 4
ENG 4013	Fundamentals of English 1 4
MTH 1000	Mathematical Preliminaries 1* 4
HST 4110	History of Civilization A† (4)
or	or
MGT 4110	Survey of Business and Management** (4)
Total Quarter Hours	12-16
Quarter 2	
ED 4004	Integrated Language Skills B 4
ENG 4014	Fundamentals of English 2 4
MTH 1010	Mathematical Preliminaries 2* 4
HST 4110	History of Civilization A (4)
or	or
ECN 4601	Economics 1** (4)
Total Quarter Hours	16
Quarter 3	
ECN 4601	Economics 1 (or Directed Elective)** 4
HST 4111	History of Civilization B 4
MGT 4110	Survey of Business and Management (or Directed Elective) 4
MTH 1113	Mathematics for Business* 4
Total Quarter Hours	16

*Students will be placed in one of three math courses depending on placement test results. Those receiving advanced placement have the option of completing MTH 1114 during freshman year.

†Eligible students may take HST 4110 in the first quarter; all others take HST 4110 in the second quarter.

**Business Track students may be assigned to ECN 4601 in Winter Quarter, MGT 4110 in Spring Quarter, but all are required to complete both courses by the third quarter.

Sample One-Year Program: Criminal Justice, Education, Arts and Sciences Track

Quarter 1	quarter hours
ED 4003	Integrated Language Skills A 4
ENG 4013	Fundamentals of English 1 4
MTH 1000	Mathematical Preliminaries 1* 4
SOC 4010	Principles of Sociology 1 (4)
Total Quarter Hours	12-16

Quarter 2		
ED 4004	Integrated Languages Skills B	4
ENG 4014	Fundamentals of English 2	4
HST 4110	History of Civilization A†	4
SOC 4011	Principles of Sociology 2	(4)
or	or	
MTH 1010	Mathematical Preliminaries 2	(4)
Total Quarter Hours		16

Quarter 3		
HST 4111	History of Civilization B	4
POL 4106	Introduction to Politics	4
SOC 4011	Principles of Sociology 2	
	(or Directed Elective)††	4
MTH 1101	Basic Algebraic Applications	4
	(or Directed Elective)††	
Total Quarter Hours		16

*Students will be placed in one of two math levels, depending on placement test results. †Eligible students may take HST 4110 in the first quarter, followed by an elective in the second quarter. Most students will take HST 4110 in the second quarter.
††The Directed Elective is to be chosen with consideration for the student’s intended major.

Sample One-Year Program: Health Sciences Track

Quarter 1	quarter hours
MTH 1010	Mathematical Preliminaries 2 4
ENG 4013	Fundamentals of English 1 4
CHM 1110	Pre-Chemistry 5
ED 4001	Integrated Language Skills Development 1 2
Total Quarter Hours	15

Quarter 2		
MTH 1106	Fundamentals of Mathematics	4
ENG 4014	Fundamentals of English 2	4
CHM 1111	General Chemistry 1	5
ED 4002	Integrated Language Skills Development 2	2
Total Quarter Hours		15

Quarter 3		
BIO 1140	Basic Animal Biology 1	4
CHM 1122	General Chemistry 2	5
ENG 1111	Freshman English 2	4
D. Elec.	Directed Elective	4
Total Quarter Hours		17

Quarter 4		
BIO 1141	Basic Animal Biology 2	4
MTH 1107	Functions and Calculus	4
D. Elec.	Directed Elective	4
Total Quarter Hours		12

Course Descriptions

Not all the courses listed in this *Bulletin* are offered every year. A final list of courses to be offered is contained in the University College *Schedule Guide*, which gives the hours and days that classes meet and their locations. These schedules are issued prior to the fall, winter, spring, and summer quarters.

Abbreviations

q.h.: quarter hours (credit earned)
cl.: hours required in class per week
Prereq.: Prerequisite

Key To Department Codes

ACC	Accounting	LNF	Language—French
AFR	African-American Studies	LNG	Language—German
ART	Art, Architecture, Graphics	LNI	Language—Italian
ASL	American Sign Language	LNJ	Language—Japanese
BIO	Biology	LNN	Language—Swedish
BL	Business Law	LNR	Language—Russian
CHM	Chemistry	LNS	Language—Spanish
CJ	Criminal Justice and Security	MGT	Management
CMN	Communication Studies	MIS	Management Information Systems
COM	Computer Literacy	MKT	Marketing
CRS	Counseling, Psychology Rehabilitation and Special Education	MLS	Medical Laboratory Science
DRA	Drama	MS	Management Science
ECN	Economics	MTH	Mathematics
ED	Education	MUS	Music
EMS	Emergency Medical Services	NUR	Nursing
ENG	English	OM	Operations Management
ESC	Earth Sciences	PED	Physical Education
FI	Finance	PHL	Philosophy and Religion
HIA	Health Information Administration	PHY	Physics
HMG	Health Management	POL	Political Science
HRM	Human Resources Management	PSY	Psychology
HSC	Health Science	PUR	Purchasing
HST	History	RAD	Radiologic Technology
HTL	Hotel and Restaurant Management	RE	Real Estate
INT	Interdisciplinary	REC	Therapeutic Recreation
JRN	Journalism	SLA	Speech-Language Pathology and Audiology
		SOA	Sociology-Anthropology
		SOC	Sociology
		TCC	Technical Communications
		TRN	Transportation

ACCOUNTING

ACC 4101 Accounting Principles 1 (3 q.h.)
Study of accounting issues and objectives for proper preparation and interpretation of financial statements. Covers the nature, function, and environment of accounting, the basic accounting model, and the accounting cycle, while emphasizing accounting for service and merchandising businesses. Also covers cash and accounts receivable.

ACC 4102 Accounting Principles 2 (3 q.h.)
Continuation of ACC 4101. Emphasizes issues in financial reporting, valuation, and income measurement. Includes inventories, plant and equipment, bonds, stockholders' equity, and changes in financial position. *Prereq.* ACC 4101.

ACC 4103 Accounting Principles 3 (3 q.h.)
Preparation and interpretation of cost accounting information and its use in the managerial decision-making process. Includes ratio analysis, present value, analysis of cost-volume relationships, fixed and variable costs, break-even analysis, job order, and process cost systems. *Prereq.* ACC 4102.

ACC 4105 Accounting Principles 1 and 2 (Intensive) (6 q.h.)
Same as ACC 4101 and ACC 4102.

ACC 4106 Accounting Principles 2 and 3 (Intensive) (6 q.h.)
Same as ACC 4102 and ACC 4103.

ACC 4120 Essentials of Personal Income Taxation (3 q.h.)
Special course for non-accounting majors, designed to teach important aspects of personal income taxation on both federal and state levels. Tax laws, tax planning, and the preparation of individual returns are emphasized.

ACC 4301 Intermediate Accounting 1 (3 q.h.)
Introduction to financial accounting concepts, techniques, and procedures. Areas of intensive treatment are the development and framework of accounting theory, basic financial statements, and cash and receivables. *Prereq.* ACC 4103.

ACC 4302 Intermediate Accounting 2 (3 q.h.)
Continuation of the study of accounting concepts and procedures. Detailed examination

of inventories, tangible and intangible assets, and depreciation. *Prereq.* ACC 4301.

ACC 4307 Intermediate Accounting 3 (3 q.h.)
Continuation of the study of accounting concepts and procedures, with emphasis given to conceptual aspects of measurement of liabilities and to alternative accounting treatments and procedures. *Prereq.* ACC 4302.

ACC 4310 Cost Accounting 1 (3 q.h.)
Examines cost determination, cost behavior, costing systems, and an introduction to budgeting. *Prereq.* ACC 4103.

ACC 4360 Accounting for Business Combinations (formerly ACC 4320) (3 q.h.)
A study of accounting issues associated with business combinations, including the purchase and pooling methods of consolidation. *Not open to students who have taken ACC 4320. Prereq.* ACC 4408 or ACC 4404.

ACC 4361 Advanced Accounting Issues (formerly ACC 4321) (3 q.h.)
The focus of this course will include an examination of accounting issues associated with governmental and nonprofit organizations. Other advanced accounting topics such as multinationals are also considered. *Not open to students who taken ACC 4321. Prereq.* ACC 4408 or ACC 4404.

ACC 4400 Accounting Information Systems (Reserved) (3 q.h.)
Provides a broad survey of accounting information systems concepts and applications. Examines how computer technology impacts accounting information processing and how accounting systems can be effectively controlled. *Prereq.* MIS 4103, ACC 4310, ACC 4407 or ACC 4307 and 80 q.h.

ACC 4408 Intermediate Accounting 4 (Reserved) (3 q.h.)
This course completes the intensive study of measurement and reporting issues in modern accounting practice. Emphasis is given to such topics as stockholder's equity and earnings per share. *Prereq.* ACC 4407 or ACC 4307 and 80 q.h.

ACC 4411 Cost Accounting 2 (Reserved) (3 q.h.)
Continuation of ACC 4410 with special emphasis on cost allocation. Covers use of cost data in decision-making and the control process. *Prereq.* ACC 4410 or ACC 4310 and 80 q.h.

ACC 4425 Auditing 1 (Reserved) (3 q.h.)
An examination of auditing concepts and standards relevant to the attest function. Includes coverage of such topics as: ethical and legal responsibilities of the auditor, internal control, and auditor reports. *Prereq.* ACC 4400 and ACC 4403 or ACC 4303 and 80 q.h.

ACC 4426 Auditing 2 (Reserved) (3 q.h.)
Continued examination of auditing concepts and standards relevant to the attest function. Includes compliance and substantive tests as they relate to specific transaction cycles and the use of statistical sampling techniques. *Prereq.* ACC 4425.

ACC 4440 Federal Income Taxes 1 (Reserved) (3 q.h.)
An in-depth study of federal tax law as it applies to individuals. In addition to a coverage of the law, tax planning concepts will be emphasized. *Prereq.* ACC 4403 or ACC 4407 or ACC 4303 or ACC 4307 and 80 q.h.

ACC 4441 Federal Income Taxes 2 (Reserved) (3 q.h.)
Continuation of ACC 4440. Property transactions, including non-taxable transactions; fundamental tax law relating to corporate formation and operation, partnerships, and S corporations. *Prereq.* ACC 4440.

ACC 4442 Federal Income Taxes 3 (Reserved) (3 q.h.)
Continuation of ACC 4441. Covers application of federal tax laws to estates, gifts, and trusts; and corporate and partnership taxation. *Prereq.* ACC 4441.

AFRICAN-AMERICAN STUDIES

AFR 4131 African-American History 1 (3 q.h.)
This survey covers the development of black America from the period of slavery through Reconstruction, with emphasis on the historical links between Africa and America and their impact on black development in the United States.

AFR 4132 African-American History 2 (3 q.h.)
This course examines the development of black America from Reconstruction to the present, and the effects of events in the United States and world history on the development of black America. There is special emphasis on contemporary issues and how these is-

sues can be seen through an historical perspective.

AFR 4151 Survey of African-American Art (3 q.h.)
Black art, like black literature, has always been an important aesthetic social statement by the African-American artist. This course offers an historical and critical examination of African-American art from the nineteenth century to the present, with special emphasis on the effects of European and African art styles on the black artist in America.

AFR 4193 Africa Today (3 q.h.)
With increasing numbers of nations striving for economic and political control in Africa, and with imperialist and colonial ideas remaining in the living memory of Africans, Africa presents a complex political and social picture to the rest of the world. This course examines some of the salient features of black art, politics, and identity in Africa.

ART AND GRAPHICS

ART 4100 History of Art to the Fourth Century A.D. (formerly History of Art) (3 q.h.)
Survey of history of Western art from prehistoric times to the end of the Roman Empire. Includes the study of major monuments, artists, and stylistic developments that evolved during the Prehistoric, Primitive, Egyptian, Mesopotamian, Aegean, Greek, and Roman periods. Slide lectures and discussions.

ART 4101 History of Art to the Sixteenth Century (3 q.h.)
Survey of history of Western art from the end of the Roman Empire to the late sixteenth century. Includes the study of major monuments, artists, and stylistic developments that evolved during the Early Christian, Byzantine, Early Medieval, Romanesque, Gothic, Early and High Renaissance, and late sixteenth-century Mannerist periods. Slide lectures and discussions.

ART 4102 History of Art to the Twentieth Century (3 q.h.)
Survey of history of Western art from the late sixteenth century to the twentieth century. Includes the study of major monuments, artists, and stylistic developments that evolved during the Baroque and Rococo periods, and in nineteenth- and twentieth-century Europe and America. Slide lectures and discussions.

ART 4105 Art Through the Ages (3 q.h.)
Concentrated historical survey of Western art from prehistoric cave paintings to the twentieth century. Includes the study of major monuments, artists, and stylistic developments found in the Pre-Classical, Classical, Medieval, Renaissance, and Baroque periods, and in nineteenth- and twentieth-century Europe and America. Slide lectures and discussions.

ART 4106 Introduction to Art (3 q.h.)
Introduction to the language, techniques, aesthetics, and visual styles of painting, sculpture, graphic art, and architecture. Includes individual and comparative studies of major works of art in each field, discussion of terminology, and historical examination of the social, political, and cultural significance of each art form. Slide lectures and discussions.

ART 4108 History of Landscape Painting (3 q.h.)
A survey of landscape painting from its origins in cave painting (pre-history) to its contemporary forms, charting the major movements in Western art, as well as significant developments in Eastern art.

ART 4110 Modern Art (3 q.h.)
Examination of major movements and developments in painting, sculpture, and architecture from the late nineteenth century to the present. Emphasizes changing aesthetic views and the artistic, philosophical, historical, sociological, and political influences shaping those views and the modern movement as a whole. Slide lectures and discussion.

ART 4112 Visual Foundations (Studio)* (3 q.h.)
An introduction to the fundamental principles, nature, and meaning of visual organization, leading to an understanding of the concepts of two- and three-dimensional art. Topics include problems of space, balance, and formal inter-relationships as they occur in a variety of fine arts and design. (*Laboratory fee.*)

ART 4115 Graphic Design for Non-majors (Studio)* (3 q.h.)
An introduction to graphic design processes, principles, and concepts. Students have the opportunity to learn how to estimate jobs, design layouts, and prepare mechanicals and page layouts. Other topics include typogra-

phy and type specification, copyfitting, design terminology, and an introduction to printing processes. (*Laboratory fee.*)

ART 4121 Principles of Drawing and Composition (Studio)* (3 q.h.)
Introduction to the fundamental principles of drawing and composition through formal graphic studies of line, shape, value, form, light, space, pattern, and texture. Stresses the use of pencil, charcoal, conte crayon, and other dry media. Slide lectures and critiques as needed. (*Laboratory fee.*)

ART 4122 Introduction to Figure Drawing (Studio)* (3 q.h.)
Introduction to drawing the human form. Includes basic studies in anatomy, proportion, negative/positive space, contour, gesture, mass, line, composition, and drawing technique. Slide lectures, critiques, and weekly sessions drawing from the model. (*Laboratory fee.*)

ART 4123 Drawing Workshop (Studio)* (3 q.h.)
Introduction to more advanced problems in the analysis of visual language and its creative organization. Emphasizes strengthening drawing techniques and developing a personal style. (*Laboratory fee.*)

ART 4126 Landscape Painting (Studio)* (3 q.h.)
An introduction to the art of landscape painting. This course will draw upon the traditions of landscape representation in the history of art, and the creative and expressive potential of each student. Sketching and painting outdoors are treated as an integral part of the courses. (*Laboratory fee.*)

ART 4127 Basic Painting (Studio)* (3 q.h.)
Introduction to the fundamentals of painting. Includes formal studio assignments in the study of color, light, pictorial space systems, form, texture, and composition to establish a foundation for more individual, creative expression. Critiques and slide lectures as needed. (*Laboratory fee.*)

ART 4128 Intermediate Painting (Studio)* (3 q.h.)
Fundamental principles of painting, followed by more advanced studies in shape, scale, texture, brushstroke, and edge as well as

**Courses designated "(Studio)" meet for 3 1/2 hours.*

color, light, form, and composition. Examines problems in a variety of stylistic approaches and techniques from the past and the present. Critiques and slide lectures as needed. (*Laboratory fee.*)

ART 4129 Painting Workshop (Studio)*
(3 q.h.)

Individual development through a structured, project-oriented approach. Encourages recognition of the conceptual aspects of painting as well as the development of a personal painting style and unique visual imagery. Critiques and slide lectures as needed. (*Laboratory fee.*)

ART 4135 Design Fundamentals (Studio)*
(formerly Design Foundations and Techniques) (3 q.h.)

Introduction to the basic principles of two-dimensional design including the organization of forms in two dimensional space and the concepts of repetition, contrast symmetrical and asymmetrical composition, balance and unity. This is a studio course in which students develop their design sense in order to move on to more sophisticated problems in graphic design. (*Laboratory fee.*)

ART 4136 Basic Watercolor Painting (Studio)* (3 q.h.)

Practice and creative expression in the technical fundamentals of watercolor. (*Laboratory fee.*)

ART 4137 Watercolor Painting Practice (Studio)* (3 q.h.)

Creative expression in various watercolor techniques. (*Laboratory fee.*) *Prereq.* ART 4136 or instructor's permission.

ART 4138 Techniques of Watercolor Painting (Studio)* (3 q.h.)

Advanced expression in watercolor. (*Laboratory fee.*) *Prereq.* ART 4137 or instructor's permission.

ART 4139 Color Theory and Practice (Studio)* (3 q.h.)

Exploration of the objective nature and expressive possibilities of color. Through class work and projects, students examine the major theories and laws of color, its harmonies and special characteristics as well as color psychology, symbolism, and orchestration. Students discover their intuition for color and develop its application in art and design. (*Laboratory fee.*)

ART 4140 Graphic Communication and Production (3 q.h.)

Overview of the design and production processes of printed materials. Examines the designer's role in concept development and layout and introduces reprographics, typesetting, printing and color techniques, paper, and bindery methods. The scheduling and economic factors involved in bringing a piece to print are also addressed.

ART 4141 Graphic Design 1 (Studio)* (3 q.h.)

Introduction to professional problem-solving in graphic design, including typographic and pictorial elements and their integration with verbal content to communicate ideas. Emphasis is on the fundamentals of visual thinking, concept development, and two-dimensional layout. Students gain experience with the design process from thumbnail sketches to the finished mechanical. (*Laboratory fee.*) *Prereq.* ART 4135 or instructor's permission.

ART 4142 Graphic Design 2 (Studio)* (3 q.h.)

Intermediate study and creative work in graphic design, with emphasis on creating overall design concepts for client presentations. Students explore effective problem-solving techniques by taking a variety of projects from concept to finished presentation. (*Laboratory fee.*) *Prereq.* ART 4141.

ART 4143 Advertising Design (Studio)*
(3 q.h.)

Introduction to advertising and to the language and design problems commonly met in the field. Study and creative work in advertising research analysis, layout, and preparation of client presentations. Marketing fundamentals are also addressed. (*Laboratory fee.*) *Prereq.* ART 4151 or instructor's permission. *Prereq. for Advertising Certificate students:* ART 4115.

ART 4151 Typography (3 q.h.)

The evolution of typography and its current applications. Emphasizes understanding basic typographic terms and techniques, acquiring composition skills such as copyfitting and type specification, understanding typography as symbol and as written record, exploring design concepts through typography, and learning the creative potential of new typesetting systems.

**Courses designated "(Studio)" meet for 3 1/2 hours.*

ART 4160 Basic Photography (Studio)*
(3 q.h.)

Use of the camera, the negative, and the black-and-white print for the beginning student. Includes weekly shooting assignments, demonstrations, and hands-on darkroom experience. (*Laboratory fee.*)

ART 4161 Intermediate Black and White Photography (Studio)* (3 q.h.)

Continuation of ART 4160. Focuses on further practice in darkroom skills and production of clear and expressive images. (*Laboratory fee.*) *Prereq.* ART 4160.

ART 4162 Photography Workshop (Studio)*
(3 q.h.)

Through close interaction with the instructor, students refine their technical skills and learn to make meaningful decisions about their relation to the world through the use of photography. Alternative processes such as infrared, toners, and large format are demonstrated and used. Contemporary trends in photography are illustrated through frequent slide presentations. (*Laboratory fee.*) *Prereq.* ART 4160 or equiv.

ART 4163 Introduction to Color Photography (Studio)* (3 q.h.)

Basic color theory and contemporary photographic processes and practices. Students work with color negative materials and print from color slides and negatives. Color printing facilities are provided. Lectures and critiques when appropriate. (*Laboratory fee.*) *Prereq.* ART 4160 or equiv.

ART 4164 Color Projects in Photography (Studio)* (3 q.h.)

Continuation of ART 4163. (*Laboratory fee.*) *Prereq.* ART 4163.

ART 4165 Seeing in Color (3 q.h.)

Investigates basic principles of color photography through lectures, demonstrations, and critique. Color slide film will be used, eliminating the need for lab work. Emphasis is on using color for creative personal expression. (No prereq.)

ART 4171 American Cinema (3 q.h.)

This course explores the uniquely distinguishing characteristics of American cinema. These range from such formal elements as camera angles, lighting, editing, sound, acting, narrative structure and construction of point of view. The course will also analyze such recurring concerns of American cinema

as the individual and community, issues of masculinity and violence, urban alienation, uprootedness and adolescence. The directors whose work will be discussed include Michael Cimino, Martin Scorsese, Robert Altman, Francis Ford Coppola, and John Ford. (*Laboratory fee.*)

ART 4173 International Cinema (3 q.h.)

This course examines films of such diverse countries as France, Italy, Greece, India, Japan, and Argentina and shows how film style and film language are culturally based and reflect the underlying values of culture. The course also analyzes the differences in the construction of narrative and point of view in the films of the different countries. The impact of cultures with communal or extended family social structures on camera angles and sound is also examined. The directors whose work will be studied include Karel Reisz, Claude Chabrol, Luchino Visconti, Kenji Mizoguchi, and Satyajit Ray. (*Laboratory fee.*)

ART 4174 Themes in Film (3 q.h.)

This course takes one theme as its subject and explores that theme fully through films from different countries. The themes include family relationships, gender, coming of age, and war, as well as the journey/road film, the concert/music film, and the exploration of the "other" in film. The course focuses on different portrayals of a given theme through analysis of film language such as camera angles, sound, editing, narrative structure, and construction of point of view, and how these relate the story of the film. (*Laboratory fee.*)

ART 4175 History of Graphic Design (3 q.h.)

Graphic design from the mid-nineteenth century (the Industrial Revolution) to the present, with references to earlier influences. Focuses on the evolution of the graphic design field, its nature and function, major periods and trends, and the influence of technology and society. Slide lectures and discussion.

ART 4176 International Directions in Graphic Design (3 q.h.)

Contemporary theories and practices in international graphic design. Focuses on design activities in such major industrial nations as Germany, Italy, France, England, Canada,

**Courses designated "(Studio)" meet for 3 1/2 hours.*

Japan, and the United States. Case studies reflecting graphic design solutions to a variety of visual communication problems are examined. Slide lectures and discussion.

ART 4181 Introduction to Computer Graphics (Studio)* (formerly Introduction to Computer-Aided Graphic Design) (3 q.h.) Introduction to the terminology, concepts, and applications of computer-aided graphic design. Through lectures, demonstrations, and labs, students explore the range of computer graphics applications on personal computer (DOS and MAC) systems; input and output devices; and the advantages and limitations of computers as design tools. Limited enrollment. (*Laboratory fee.*) *Prereq.* ART 4141.

ART 4183 Electronic Publishing Design (Studio)* (3 q.h.) Designed to teach the computer novice how to apply the basics of desktop publishing software for business and corporate publications. Students will use a variety of PC application programs including PageMaker. Design, page-layout, typography, hardware, and management issues will be applied to actual publications and business documents. Limited enrollment. (*Laboratory fee.*) *Prereq.* ART 4181.

ART 4184 Presentation Graphics (Studio)* (3 q.h.) Students will create and produce computerized slide presentations. Emphasis is placed on the selection and layout sequencing of type, visuals, and peripheral elements for word slides, graphs, charts, and illustrations to be used in corporate, educational, and advertising presentations. Limited enrollment. (*Laboratory fee.*) *Prereq.* ART 4181.

ART 4185 Creative Imaging: Custom Computer Design (Studio)* (3 q.h.) Scanning and image enhancement techniques are utilized to create original visuals appropriate for advertising and publishing graphics as well as fine art. Limited enrollment. (*Laboratory fee.*) *Prereq.* ART 4181.

ART 4186 Computer Graphic Design Portfolio (Studio)* (3 q.h.) Students may choose to either edit and refine a series of their best computer graphic designs or to work on a specific portfolio design project. All students will design a self-promotion piece using the layout application of their choice. (*Laboratory fee.*) *Prereq.* ART 4185

and 30 q.h. of computer graphic certificate courses. (Not a regularly scheduled course. Students must contact Liberal Arts Office to register to work with an instructor.)

ART 4187 Advanced Computer Illustration (Studio)* (formerly Graphic Software Studies 1) (3 q.h.) Advanced computer illustration studies using popular vector-based drawing programs such as Adobe Illustrator, Aldus Freehand, and Corel Draw. Limited enrollment. (*Laboratory fee.*) *Prereq.* ART 4183.

ART 4188 Advanced Raster Graphics (Studio)* (formerly Graphic Software Studies 2) (3 q.h.) Identification and application of pixel/raster-based paint programs such as Targa Tips, Pixel Paint, and Photoshop. Limited enrollment. (*Laboratory fee.*) *Prereq.* ART 4183 and ART 4185.

ART 4189 Advanced Electronic Publishing Design (Studio)* (formerly Graphic Software Studies 3) (3 q.h.) Identification and application of pagination, layout, and design programs such as PageMaker and Quark Xpress. Limited enrollment. (*Laboratory fee.*) *Prereq.* ART 4183.

ART 4204 Italian Renaissance Art (3 q.h.) Survey of Italian painting, sculpture, and architecture of the fifteenth and sixteenth centuries, with special attention to their historical, cultural, and social contexts. Considers how Renaissance ideals were reflected in the renewed interest in classical harmony and order, and in the growing self-awareness, individualism, and naturalism of the time. Covers such artists as Giotto, Donatello, Botticelli, Michelangelo, da Vinci, Raphael, and Titian.

ART 4210 French Painting (3 q.h.) Development of French painting from the French Revolution through the nineteenth century. Examines Neoclassicism, Romanticism, Realism, Impressionism, and Post-Impressionism, focusing on such figures as David, Delacroix, Courbet, Manet, Degas, Monet, Renoir, Cezanne, and Van Gogh. Also examines the French interest in the formal problems of painting and the painting process as distinct from its narrative content.

*Courses designated "(Studio)" meet for 3 1/2 hours.

ART 4213 Modern Painting (3 q.h.)

Developments in painting from the late nineteenth century through the early 1930s, examining major schools, movements, and artists from Post-Impressionism through Surrealism. Focuses on important shifts in painting concepts and the rise of innovative modes of expression instrumental in establishing the foundation of Modernism.

ART 4214 Contemporary Painting (3 q.h.)

Developments in painting from the early 1940s to the present, including major schools, movements, and artists. Focuses on the cultural impact of the exodus of artists from Europe to the United States prior to World War II, the meteoric rise of Abstract Expressionism, and the diversity of movements since World War II, such as Pop Art, Minimalism, Conceptual Art, and New Realism.

ART 4220 American Painting and Sculpture (3 q.h.)

American painting and sculpture from colonial times through the early 1930s. Includes the study of painting from itinerant colonial "limners" through Copley, Benjamin West, and the English tradition; the Hudson River School; Eakins, Hopper, Marin, Stella, and O'Keeffe; and the founding of American Modernist painting. Also examines sculpture from colonial gravestone reliefs through Rush, August, and the public monuments of French, Saint-Gaudens, and Calder.

ART 4223 American Architecture (3 q.h.)

American architecture from the Colonial period through the early 1930s. Includes the seventeenth-century Early American style, the eighteenth-century Georgian style, the Republican style, mid-nineteenth-century Revival styles, the Stick-and-Shingle styles, Richardsonianism, Sullivan and the rise of the skyscraper, and Frank Lloyd Wright.

ART 4228 Twentieth-Century Architecture (3 q.h.)

Introduction to European and American architecture of the twentieth century. Examines Gropius's Bauhaus tenets concerning housing, urban planning, and utilitarian mass production; Mies van der Rohe, Le Corbusier, and the International style; Frank Lloyd Wright; and the foundation of American architectural Modernism as exemplified by Neutra, Johnson, Saarinen, and Buckminster Fuller.

ART 4230 History of Photography (3 q.h.)

Developments in photography from the early daguerreotypes to the present. Includes major movements, styles, artists, and significant technological developments. Slide lectures and assigned readings.

ART 4231 Contemporary Photography (3 q.h.)

Evolution of styles and techniques in contemporary photography since World War II. Emphasis is on the variety of image-making techniques and photographic styles and concepts of the last twenty years. Slide lectures and assigned readings.

ART 4251 Portfolio Development (Studio)* (formerly Advanced Graphic Design) (3 q.h.)

Portfolio-development course for students who have successfully completed all other Graphic Design and Visual Communication certificate program requirements. Emphasis is on professional design skills and personal style. (*Laboratory fee.*) *Prereq.* ART 4151 and 27 q.h. of graphic design certificate courses.

ART 4366 Promotional and Technical Publications: Design and Production (Studio)* (3 q.h.)

Design, production, and economics of promotional and technical publications. Using a desktop design/publishing system, students explore creative solutions in producing marketing, advertising, and sales-support publications as well as technical service manuals, operating guides, and other documentation. (*Laboratory fee.*) *Prereq.* ART 4183. *Not open to students who have taken ART 4364 or ART 4365.*

ART 4367 Pictorial Imagery for the Graphic Designer (Studio)* (formerly Illustration) (3 q.h.)

An introductory course in image conceptualization including photography and illustration. Techniques and methods covered include cropping and scaling, photo shoots and art direction, photo manipulation, research and buying original art and stock. (*Laboratory fee.*)

ART 4368 Graphic Design for Media (3 q.h.)

Surveys the expanding use of slide-tape, multi-image, and multi-media video and film in areas ranging from public relations and sales to documentary and entertainment

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presentations. The collaborative role of writers, producers, and art directors in the design and production of media projects, particularly audio-visual projects, is explored. *Prereq.* ART 4151.

ART 4402 Marketing Strategies for Printing and Publishing (3 q.h.)

Topics include the integrated nature of marketing; the relationship of marketing to product development; advertising, promotion, and sales; the creation of marketing support materials; and the development of an overall marketing plan and timeline.

ART 4410 Electronic Imaging Systems (Studio)* (3 q.h.)

An introduction to current black-and-white and color image scanning, processing and separation technology for page and film assembly. Concepts, terminology, and techniques of manipulating, merging, and creating color corrected and separated graphics. (*Laboratory fee.*) *Prereq.* ART 4366.

ART 4421 Methods of Book Design (Studio)* (3 q.h.)

The basic terminology, tools, and skills of book design. Students practice drawing layouts, casting off manuscript, specifying type, and dummyping pages. (*Laboratory fee.*)

ART 4475 Graphic Arts Production Control (3 q.h.)

The techniques of managing production in commercial printing and publishing plants. Specialization vs. standardization, production forecasting and control; routing and planning; records of production; quality control; and effective use of personnel. Various production management controls of web- and sheet-fed, commercial, and publication printing are presented, analyzed, and discussed.

ART 4479 Estimating Procedures for the Graphic Arts (3 q.h.)

Basic estimation procedures and principles for single- and multi-color printing. All facets of planning the job for estimating: design and layout, typography, paper, prep and plates, presswork, binding, and finishing. Emphasis throughout is on active student participation in solving practical estimation problems.

ART 4600 Fundamentals of Publishing (3 q.h.)

An overview of the publishing industry, from the initial "why" to new trends and how they

affect its future. Topics covered include: acquisitions, editorial work, design and art preparation, production and manufacture, marketing, and the importance of coordinating all functions within a publishing company.

ART 4605 Rights and Reproductions (3 q.h.)

An overview of the copyright law and subsidiary rights, including the negotiation of rights in the original contract, the role of the permissions editor, and current contract and legal issues facing writers and editors today.

ART 4810 Honors Program 1 (4 q.h.)

Opportunity to undertake an in-depth research study project. See page 24 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

ART 4811 Honors Program 2 (4 q.h.)

See ART 4810.

ART 4812 Honors Program 3 (4 q.h.)

See ART 4810.

ART 4815 Advanced Tutorial 1 (3 q.h.)

Opportunity to take upper-level course independently. See page 23 for details. *Prerequisite* 87 q.h.

ART 4816 Advanced Tutorial 2 (3 q.h.)

See ART 4815.

ART 4820 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 24 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

ART 4821 Independent Study 2 (3 q.h.)

See ART 4820.

ART 4822 Independent Study 3 (3 q.h.)

See ART 4821.

ART 4823 Field Work in Art (6 q.h.)

Designed to enhance career development by allowing students to earn credit for the application of their academic backgrounds to practical problems in the work place. See page 23 for details.

AMERICAN SIGN LANGUAGE

ASL 4101 American Sign Language 1 (4 q.h.)

Introduction to American Sign Language, the language used by members of the deaf community in the United States and parts of

**Courses designated "(Studio)" meet for 3 1/2 hours.*

Canada. Focuses on conversation in signs, basic rules of grammar, and cultural aspects of the deaf community.

ASL 4102 American Sign Language 2 (4 q.h.) Continuation of basic American Sign Language and culture study, with emphasis on building receptive and expressive sign vocabulary; use of signing space; use of nonmanual components, including facial expressions and body postures; and an introduction to finger spelling. *Prereq.* ASL 4101 or by examination.

ASL 4201 Intermediate American Sign Language 1 (4 q.h.) Further development of receptive and expressive skills, finger spelling, vocabulary building, and grammatical structures. Encourages more creative use of expression, classifiers, body postures, and the signing space. Introduces sign variations (regional and ethnic), and political and educational institutions of the deaf community. *Prereq.* ASL 4102 or by examination.

ASL 4202 Intermediate American Sign Language 2 (4 q.h.) Intensive practice involving expressive and receptive skills in storytelling and dialogue. Introduces language forms found in ASL poetry and cultural features as they are displayed in art and theatre. *Prereq.* ASL 4201.

ASL 4301 Advanced American Sign Language Proficiency 1 (4 q.h.) Vocabulary building and mastery of grammar through rigorous receptive and expressive language activities. Includes student-led discussions, debates, and prepared reports on topics in deaf culture, society, and current affairs. Includes ten hours of field work. *Prereq.* ASL 4202.

ASL 4302 Advanced American Sign Language Proficiency 2 (4 q.h.) Continuation of ASL 4301. Includes ten hours of field work. *Prereq.* ASL 4301.

ASL 4410 Linguistics of American Sign Language (3 q.h.) For skilled ASL signers with no previous training in linguistics. Conducted in ASL, the course is descriptive and data-oriented rather than theoretical. Includes the parts of a sign; building words in ASL; sentence structure (questions, statements, relative clauses, etc); the meaning and issue of iconicity; organization of sentences according to old and new information; and the

structure of stories. Also, grammatical features of ASL, such as classifiers, specifiers, verb modulations and aspects, and the role of facial expression. *Not open to students who have taken ASL 4404. Prereq.* ASL 4202.

ASL 4411 Deaf History (3 q.h.) The history of deaf people in the Western world, with emphasis on the American deaf community, its language, education, and relation to hearing society. *Not open to students who have taken ASL 4403. Prereq.* ASL 4101 or instructor's permission.

ASL 4412 American Deaf Culture (3 q.h.) The status of deaf people as both a linguistic and cultural minority group. Designed for individuals who may or may not have had prior experience with deaf people, the course raises questions concerning the nature of sign language and its varieties, the education of deaf people, the historical treatment of deafness, the sociological and cultural makeup of deaf individuals, and the nature of ASL literature and poetry. *Not open to students who have taken ASL 4402. Prereq.* ASL 4101 or instructor's permission.

ASL 4413 Deaf Literature (3 q.h.) Covers various genres of deaf literature by and/or about deaf people. Concentrates on deaf characters and the influences deaf culture and deaf history have on the literary works. Includes selected works from the early 1900s to the present, including videotaped materials. *Not open to students who have taken ASL 4401. Prereq.* ASL 4202 or by examination.

ASL 4600 Introduction to Interpreting (formerly ASL 4501 Sign Language Interpreting I) (3 q.h.) Overview of the field of interpretation. Emphasis is on exploring interpretation as a career option by identifying requisite responsibilities, skills, and aptitudes, the process of becoming an interpreter, employment options, and current issues in the field. *Prereq.* Completion of the ASL and Deaf Studies Certificate or instructor's permission.

ASL 4601 American Sign Language-English Interpreting 1 (4 q.h.) Study of the process of interpretation, overview of theoretical models, practice of requisite skills and process tasks, application of skills and theory to the translation process. *Prereq.* ASL 4600, ASL 4609 (may be taken concurrently), or instructor's permission.

ASL 4602 American Sign Language-English Interpreting 2 (4 q.h.)

Continuation of the study of the interpretation process, including practice of requisite skills and process tasks of increased complexity. Application of process skills, contrastive ASL-English linguistics, contrastive cultural analysis and teaming skills to the consecutive interpretation process. *Prereq.* ASL 4601, ASL 4610 (may be taken concurrently), or instructor's permission.

ASL 4603 American Sign Language-English Interpreting 3 (4 q.h.)

Continuation of the study of the interpretation process, including practice of requisite skills and process tasks of increased complexity, and application of process skills and contrastive group dynamics and discourse analysis to the simultaneous interpretation process. *Prereq.* ASL 4602 or instructor's permission.

ASL 4604 Special Topics in Interpreting 1 (3 q.h.)

Theory and practice of interpreting within one specialized area of interpreting or with one unique population. Topics rotate and may include subjects such as interpreting within specific mental health settings, interpreting within specific medical settings, interpreting within legal settings, interpreting for deaf-blind persons, and interpreting for foreign language deaf persons. *Prereq.* instructor's permission.

ASL 4605 Special Topics in Interpreting 2 (3 q.h.)

Exploration of current topics in the field of interpreting. Topics rotate and may include linguistic issues for interpreters, professional and ethical considerations, and health issues. *Prereq.* instructor's permission.

ASL 4606 Interpreter Role and Ethics (3 q.h.)

Exploration of ethical standards and dilemmas in ASL-English interpretation through the use of discussion, hypothetical situations, and role plays. Emphasis is on values, ethics, and morality; professional principles; power, responsibility, and group dynamics; and the decision-making process. *Prereq.* ASL 4602, ASL 4603 (may be taken concurrently), or instructor's permission.

ASL 4607 Interpreting Lab (4 q.h.)

Practice in consecutive and simultaneous interpreting skills, with constructive feedback. *Prereq.* ASL 4602 or instructor's permission.

ASL 4608 Practicum (4 q.h.)

Practical interpreting experience in agencies serving deaf people. Biweekly seminar focuses on linguistic and ethical questions and dilemmas. Requires six hours per week of practicum experience in an agency. *Prereq.* ASL 4603, ASL 4606, ASL 4607 with a grade of B or better, or instructor's permission.

ASL 4609 Contrastive Analysis for Interpreters (4 q.h.)

Study of the major linguistic features and cultural features of D/deaf and non-D/deaf communities. Compares and contrasts basic similarities and differences in the morphology, phonology, syntax, and semantics of ASL and English and the values, beliefs and norms of the D/deaf and non-D/deaf communities. Primary focus is on the use of pragmatics and communication at the discourse level and on increasing awareness of American deaf culture and general American culture. *Prereq.* ASL 4600 or instructor's permission.

ASL 4610 Interpreters at Work (3 q.h.)

Exploration of the day-to-day concerns of working as an interpreter, focusing on group dynamics and various populations, settings, and environmental factors, business aspects of the field, and how and when to work as a team. Focuses further attention on increasing awareness of American deaf culture and general American culture. *Prereq.* ASL 4600 or instructor's permission.

ASL 4800 American Sign Language Interpreting Seminar (formerly ASL 4507-ASL 4510 American Sign Language Interpreting Seminars) (1 q.h.)

Short-term training opportunities for currently practicing sign language interpreters, scheduled for two Saturdays each fall, winter, and spring quarter. Because the topics or skill areas addressed change from quarter to quarter, students may take this course repeatedly for credit. Limited enrollment. For topic information, call American Sign Language Programs, 617-373-3064 or TTY 617-373-3067.

ASL 4801 Advanced Tutorial in ASL 1 (4 q.h.)

Opportunity for qualified student to take a required upper-level ASL course as a tutorial when it is not available in the usual format. See page 23 for details.

ASL 4802 Advanced Tutorial in ASL 2 (4 q.h.)
See ASL 4801.

ASL 4803 Independent Study 1 (3 q.h.)
Opportunity to undertake special research.
See page 24 for details.

ASL 4804 Independent Study 2 (3 q.h.)
See ASL 4803.

ASL 4805 Independent Study 3 (3 q.h.)
See ASL 4803.

BIOLOGY

BIO 4103 Biology 1 (Principles) (4 q.h.)
This course provides an introduction to a variety of biological concepts. Plant and animal characteristics are surveyed through comparisons of cell structure and function. Specific topics include: Cytology, Histology, Physiology, Genetics, Cellular respiration, and Botany. *To receive credit for this course, you must also register for BIO 4153, Lab for Biology 1. (Laboratory fee.)*

BIO 4104 Biology 2 (Diversity) (4 q.h.)
Experience the diversity of life through a systematic survey of organisms. Beginning with unicellular algae, this course follows the major evolutionary trends leading to complex forms. Specific elements of structure, function, and natural history will be examined. *To receive credit for this course, you must register for BIO 4154, Lab for Biology 2. (Laboratory fee.)*

BIO 4105 Biology 3 (Animal) (4 q.h.)
This course provides an introduction to basic animal structure and function. The anatomy of each body system is described. Physiological processes such as hormonal control, nerve impulse transmission, muscular contraction, and the immune response are introduced. *In order to receive credit for this course, you must register for BIO 4155, Lab for Biology 3. (Laboratory fee.)*

BIO 4125 Biology of AIDS (3 q.h.)
This course will explore the biological aspects of AIDS in order to understand the complexities inherent in finding a cure. Topics include: the origins of the disease; the destruction of the immune system; factors influencing the pathogenesis of HIV towards AIDS and modes of transmission. The epidemiology and projected spread will be discussed as well as the medical aspects of current treatment modalities.

BIO 4133 Special Topics in Botany* (3 q.h.)
Topics covered: How botany impacts human life and society; current genetic manipulation of agricultural plants; historical role of plants in pharmacology; the role of plants and agriculture in the cultural evolution of man (nomad to farmer); botany in literature and poetry.

BIO 4175 Human Anatomy and Physiology 1 (3 q.h.)
Human regional anatomy. Topics include terminology and basic gross organization of the body, functional anatomy of the musculoskeletal system, thoracic and abdominopelvic splanchnology and angiology, and an overview of head and neck anatomy. The laboratory is concerned with the study of the human skeleton and appropriate dissections. *The required laboratory is BIO 4195, Lab for Human Anatomy and Physiology 1. (Laboratory fee.) Although there is no prereq., prior coursework in general biology is recommended.*

BIO 4176 Human Anatomy and Physiology 2 (3 q.h.)
Properties of cell membranes; functional anatomy and physiology of the nervous system; contraction of muscle; special senses; endocrinology. The laboratory generally includes membrane physiology, gross and microscopic anatomy of the nervous and endocrine system and testing of somatic and special senses. *The required laboratory is BIO 4196, Lab for Human Anatomy and Physiology 2. (Laboratory fee.) Prereq. BIO 4175 or equivalent is recommended.*

BIO 4177 Human Anatomy and Physiology 3 (3 q.h.)
Functional anatomy and physiology of the respiratory, cardiovascular, digestive, urinary, and reproductive systems; fetal development. The laboratory generally deals with the microscopic anatomy and physiology of these systems. Demonstration material is presented for reproductive system and development. *The required laboratory is BIO 4197, Lab for Human Anatomy and Physiology 3. (Laboratory fee.) Prereq. BIO 4176 or equiv.*

BIO 4178 Anatomy and Physiology A (4 q.h.)
(Registration restricted to paramedic students.) Human anatomy and physiology. Describes the cell and its physiology, the structure of tissues, and the anatomy and

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physiology of the cardiovascular system and blood, the respiratory system, and the urinary system. *The required laboratory is BIO 4198, Lab for Anatomy and Physiology A. (Laboratory fee.) BIO 4178 and BIO 4179 may not be substituted for BIO 4175, 4176, 4177.*

BIO 4179 Anatomy and Physiology B (4 q.h.)
(Registration restricted to paramedic students.) Continuation of BIO 4178. Describes the anatomy and physiology of the nervous system, skeletomuscular system, digestive system, endocrine and reproductive systems. *The required laboratory is BIO 4199, Lab for Anatomy and Physiology B. (Laboratory fee.) Prereq. BIO 4178. BIO 4178 and BIO 4179 may not be substituted for BIO 4175, 4176 and 4177.*

BIO 4185 The Natural World of Massachusetts 1* (3 q.h.)
Ecological analysis of the human situation and human interaction with other organisms; the necessary foundation of biological principles.

BIO 4186 The Natural World of Massachusetts 2* (3 q.h.)
Continuation of BIO 4185. *Prereq. BIO 4185 or equiv.*

BIO 4190 Microbiology 1 (3 lab., 3 q.h.)
Morphology and biochemistry of bacteria. *The required laboratory is BIO 4200, Lab for Microbiology 1. (Laboratory fee.) Prereq. BIO 4105 or equiv.*

BIO 4191 Microbiology 2 (3 q.h.)
Survey of pathogenic microorganisms. *The required laboratory is BIO 4201, Lab for Microbiology 2. (Laboratory fee.) Prereq. BIO 4190 or equiv.*

BIO 4192 Microbiology 3 (3 q.h.)
Examination of the characteristics and role of microorganisms in the environment. *The required laboratory is BIO 4202, Lab for Microbiology 3. (Laboratory fee.) Prereq. BIO 4191 or equiv.*

BIO 4224 Ecology 1 (3 q.h.)
Introduction to the concepts of limiting factors, biogeochemical cycles, trophic levels and energy transfer and their relationship to the structure and function of populations, species, communities and ecosystems. Knowledge of General Biology is helpful.

BIO 4225 Ecology 2 (3 q.h.)
Principles applied to aquatic systems with special references to physicochemical fac-

tors, typical habitats and communities. Eutrophication and toxic chemical groundwater pollution, as well as air pollution, the greenhouse effect and ozone depletion are considered. *Prereq. BIO 4224 or equiv.*

BIO 4226 Ecology 3 (3 q.h.)
Fundamentals of pests, pest control and pesticides. Study of wild plant, animal, energy, mineral and land resources with an introduction to the economics and politics of the environment. *Prereq. BIO 4225 or equiv.*

BIO 4235 Genetics 1 (3 q.h.)
Topics include nucleic acid structure, replication of genetic materials, mitosis, meiosis, and Mendelian inheritance. *Prereq. BIO 4103.*

BIO 4236 Genetics 2 (3 q.h.)
Examination of mutation, regulation of gene expression, population genetics, engineering, and genetics of bacteria and viruses. *Prereq. BIO 4235.*

BIO 4237 Genetics Laboratory (2 q.h.)
Laboratory exercises involving principles of Mendelian inheritance, linkage, and crossing-over. Classical genetics utilizing *Drosophila*; biochemical studies utilizing *Neurospora* and *E. coli*. *(Laboratory fee.) Prereq. BIO 4236 or equiv.*

BIO 4246 Cell Biology 1 (3 q.h.)
Chemical composition, structure of cells and organelles, transport processes, cell motion and excitability, and growth. *Prereq. BIO 4103, and CHM 4113 or equiv.*

BIO 4247 Cell Biology 2 (3 q.h.)
Cellular energy supply, enzyme function, respiration and metabolism, photosynthesis and other synthetic pathways, and control of cellular processes. *Prereq. BIO 4246 or equiv.*

BIO 4248 Cell Biology Laboratory (2 q.h.)
Laboratory techniques in cell biology, microscopy, structure and chemical composition of cells, enzyme measurements, photosynthesis, respiration, active transport, and growth. *(Laboratory fee.) Prereq. BIO 4247 or equiv.*

BIO 4258 Advanced Human Physiology 1 (3 q.h.)
Study of human physiology emphasizing cellular processes and underlying organ functions and the interactions and control of

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organ systems. Selected physiological topics are considered as time allows. *Prereq. by permission of the instructor.*

BIO 4259 Advanced Human Physiology 2 (3 q.h.)

Cardiovascular considerations; the immune system; the AIDS problem; biological control mechanisms; selected endocrine topics. *Prereq. BIO 4258.*

BIO 4260 Cell, Tissue and Organ Culture (3 q.h.)

General principles and technique of tissue culture and preservation. The behavior of cells in culture, cell lines and relevant media are discussed. Methodology of animal and plant culture and its use in virology, cancer research and radiobiology.

BIO 4300 Computer Applications in Science (3 q.h.)

Research science stands to gain from various programming applications specifically geared towards its needs. A scientist faced with a problem requiring repeated calculations must decide whether to purchase a software package, if available, to be used by specifying the parameters to fit a particular problem or to write a specific program that is completely tailored to his/her research area. Both cases require the scientist to know about computer systems and programming. This course introduces students to mainframe VAX/VMS BASIC, and covers programming techniques suited to solving scientific problems. It is designed to cover topic areas appropriate for an introductory course on various program applications in science. *Prereq. experience with computers.*

BIO 4320 Medical Microbiology (4 q.h.) (Summer Quarter only) Major characteristics of disease-producing organisms. *The required laboratory is BIO 4330, Lab for Medical Microbiology (Laboratory fee), which generally meets on a different night. Prereq. BIO 4192 or professional laboratory experience in bacteriology.*

BIO 4321 Soil Microbiology (3 q.h.)

An overview of the major groups of microorganisms in the soil environment, their description, abundance, significance and function. Discussion of the major transformations mediated by these organisms. Ecological relationships among microflora, soil-borne pathogens and higher plants; the rhizosphere; production of antibiotics and other

secondary metabolites; pesticides; metabolism of recalcitrant molecules.

BIO 4374 Histology 1 (3 q.h.)

Examination of cell structure and tissue organization, including epithelium, muscle, and connective tissue. Also covers cartilage, bone, and nervous system. *The required laboratory is BIO 4384, Lab for Histology 1. (Laboratory fee.) Prereq. BIO 4175 or permission of instructor.*

BIO 4375 Histology 2 (3 q.h.)

Examination of the brain, blood, skin, cardiovascular and lymphatic systems, as well as the gastrointestinal system, including the oral cavity, GI tract, liver, and gall bladder. *The required laboratory is BIO 4385, Lab for Histology 2. (Laboratory fee.) Prereq. BIO 4374 or permission of instructor.*

BIO 4376 Histology 3 (3 q.h.)

Examination of the respiratory, urinary, and male and female reproductive systems, as well as the endocrine glands and the eyes and ears. *The required laboratory is BIO 4386, Lab for Histology 3. (Laboratory fee.) Prereq. BIO 4375 or permission of instructor.*

BIO 4411 Embryology and Development 1 (3 q.h.) (Winter Quarter, offered on an every other year schedule. This course will be offered in the 1993-94 academic year.)

Topics include gametogenesis, reproductive physiology, fertilization, blastulation, gastrulation, and early embryogenesis. *Required laboratory BIO 4421, emphasizes invertebrate and amphibian embryology. (Laboratory fee.) Prereq. BIO 4374 or equiv.*

BIO 4412 Embryology and Development 2 (3 q.h.) (Spring Quarter, offered on an every other year schedule. This course will be offered in the 1993-94 academic year.)

Topics include morphogenesis and pattern formation, placentation, and organogenesis. *Required laboratory BIO 4422, emphasizes chick and pig embryology. (Laboratory fee.) Prereq. BIO 4411 or equiv.*

BIO 4441 Parasitology (4 q.h.)

(Spring Quarter only) Parasitic organisms, particularly those affecting humans and domestic animals, and their life cycles, modes of transmission, and diagnosis and treatment. Includes microscopic examination of prepared and live material. *The required laboratory is BIO 4451, Lab for Parasitology. (Laboratory fee.) Prereq. BIO 4103 or instructor's permission.*

BIO 4455 Introduction to Biotechnology

(3 q.h.)

Examines the historical development, basic technologies, and commercial potential of biotechnology. Basic biological concepts are first reviewed including the steps leading to the 20th century revolution in molecular and cell biology. The technology of recombinant DNA, monoclonal antibody production, and nucleic acid probe development are outlined along with their therapeutic, diagnostic, and experimental uses. Newer, emerging technologies and applications are discussed where appropriate. The commercial state-of-the-art and its developmental marketing problems are included. *Prereq. one year each, college-level chemistry and biology, or permission of instructor.*

BIO 4461 Immunology (4 q.h.)

Biological, chemical, and physical attributes of antigens and antibodies, together with their serological interactions. *Presentation of the material will be by lecture and demonstration. Prereq. BIO 4191, CHM 4263 or equiv.*

BIO 4501 Development of New Virus

Vaccines (3 q.h.)

Biological and molecular properties of viruses are integrated with recombinant DNA technology to probe current strategies in viral vaccine development. The genomic organization, virion structure and viral pathogenesis of medically relevant diseases will be discussed. Material is presented on the basis of specific examples from current literature. Emphasis on factual knowledge coupled with an understanding of experimental design and data analysis. *Prereq. BIO 4103 or instructor's permission.*

BIO 4700 Advanced Tutorial 1 (4 q.h.)

Opportunity to take upper-level course independently. See page 23 for details. *Prereq. 87 q.h.*

BIO 4701 Advanced Tutorial 2 (4 q.h.)

See BIO 4700.

BIO 4801 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 24 for details. *Prereq. 96 q.h. and 3.0 q.p.a.*

BIO 4802 Independent Study 2 (3 q.h.)

See BIO 4801.

BUSINESS LAW

BL 4101 Law 1 (3 q.h.)

Introduction to the legal system. Study of the nature, formation, and essential elements of contracts, including performance and remedies for breach. Also covers agency law, including the rights and duties of principal and agent, the scope of authority, and relationships to third persons.

BL 4102 Law 2 (3 q.h.)

Sales as governed by the Uniform Commercial Code, including the law of warranty, business organizations, partnerships, corporations, and other important business forms. *Prereq. BL 4101.*

BL 4103 Law 3 (3 q.h.)

Commercial paper, the function of negotiability, bank checks and promissory notes, real property, personal property, bailments, bankruptcy, and secured transactions. *Prereq. BL 4102.*

BL 4105 Law (Intensive) (6 q.h.)

Same as BL 4101 and BL 4102.

BL 4110 Law for Managers (3 q.h.)

Study of legal problems for managers including rights and duties in the employment relationship, acquisition of computer software and hardware, effective use of legal counsel, personal liability issues for managers, credit and collection law, and other selected topics of interest.

BL 4115 Law and Social Issues (3 q.h.)

Structure and dynamics of the American legal system through analysis of selected cases dealing with social issues.

BL 4120 Law for Personal Planning (3 q.h.)

Legal aspects of personal and family planning, including consumer rights, wills and estate planning, marital law, real estate purchase, tenants' rights, and other selected topics of interest.

BL 4316 International Business Law (3 q.h.)

Surveys the leading principles in international business law as applied in decisions of domestic and international courts; the sources, development and authority of international business law, such as the laws of the European Common Market; and the making, interpretation and enforcement of treaties, and the organization and jurisdiction of international tribunals.

CHEMISTRY

CHM 4105 Chemistry and the Environment (3 q.h.)

Fundamental chemical principles, using examples from the geochemical and the internal environments of human beings as well as the home, the farm, and the workplace. No laboratory required.

CHM 4111 General Chemistry 1 (3 q.h.)

Fundamental chemistry concepts, such as symbols, formulas, equations, atomic weights, and calculations based on equations. Also covers gases, liquids, solutions, and ionization. *The required laboratory is CHM 4117, Lab for General Chemistry 1. (Laboratory fee.) Prereq. MTH 4112 or equiv. (can be taken concurrently).*

CHM 4112 General Chemistry 2 (3 q.h.)

Atomic structure, bonding, molecular structure, oxidation and reduction reactions, and equilibrium and kinetics. *The required laboratory is CHM 4117, Lab for General Chemistry 2. (Laboratory fee.) Prereq. CHM 4111 or equiv.*

CHM 4113 General Chemistry 3 (3 q.h.)

Thermochemistry and electrochemistry, acids, bases, and solubility products, nuclear chemistry, introductory organic chemistry, and biochemistry. *The required laboratory is CHM 4119, Lab for General Chemistry 3. (Laboratory fee.) Prereq. CHM 4112 or equiv.*

CHM 4221 Analytical Chemistry 1 (3 q.h.)

Principles of gravimetric and titrimetric analysis (wet chemistry). Introduces statistics as applied to analytical chemistry and examines such topics as chemical equilibrium and acid-base equilibria in simple and complex systems. Gravimetric and titrimetric experiments are performed. *The required laboratory is CHM 4227, Lab for Analytical Chemistry 1. (Laboratory fee.) Prereq. CHM 4113 or equiv.*

CHM 4222 Analytical Chemistry 2 (3 q.h.)

Continuation of CHM 4221. Covers complex formation titration, precipitation titrations, and oxidation-reduction titrations. Electrical methods of analysis, such as potentiometry, electrolysis, coulometry, and polarography, are discussed and titrimetric analyses and experiments involving electricity are performed. *The required laboratory is CHM 4228, Lab for Analytical Chemistry 2. (Laboratory fee.) Prereq. CHM 4221 or equiv.*

CHM 4223 Analytical Chemistry 3 (3 q.h.)
Spectrophotometry as a method of analysis, including ultraviolet, visible, infrared, and fluorescence methods; flame emission; and atomic absorption. Studies of solvent extractions and chromatographic methods of separation, such as gas-liquid chromatography and liquid chromatography. *The required laboratory is CHM 4229, Lab for Analytical Chemistry 3. (Laboratory fee.) Prereq. CHM 4222 or equiv.*

CHM 4224 Analytical Chemistry (4 q.h.)
(Summer Quarter only) Principles and theories of volumetric, gravimetric, and instrumental analysis. Application made in the laboratory with analyses of unknown samples. *The required laboratory is CHM 4226, Lab for Analytical Chemistry. (Laboratory fee.) Prereq. CHM 4113 or equiv.*

CHM 4261 Organic Chemistry 1 (4 q.h.)

Nature of carbon in organic compounds. General principles of structure, nomenclature, preparation, uses, and reactions of aliphatic hydrocarbons: alkanes, alkenes, alkynes, dienes, cycloalkanes. Position and geometric isomerism. Introduces free radical and ionic mechanisms of reactions. The laboratory generally deals with the preparation and properties of compounds discussed in the lecture. *The required laboratory is CHM 4267, Lab for Organic Chemistry 1. (Laboratory fee.) Prereq. CHM 4113 or equiv.*

CHM 4262 Organic Chemistry 2 (4 q.h.)

Structure of benzene, electrophilic aromatic substitution reactions. General principles of structure, nomenclature, preparation, uses, and reactions of the various types of organic compounds, including alcohols, alkyl and aryl halides, ethers and epoxides, and carboxylic acids. Also covers optical isomerism and introductory chemical kinetics. The laboratory generally deals with the preparation and properties of compounds discussed. *The required laboratory is CHM 4268, Lab for Organic Chemistry 2. (Laboratory fee.) Prereq. CHM 4261 or equiv.*

CHM 4263 Organic Chemistry 3 (4 q.h.)

Continuation of CHM 4262. Emphasizes the application of chemical conversions to synthetic problems. Includes functional derivatives of carboxylic acids, sulfonic acids and their derivatives, amines, diazonium compounds, phenols, aldehydes, and ketones.

The laboratory generally deals with the preparation and properties of compounds discussed. *The required laboratory is CHM 4269, Lab for Organic Chemistry 3. (Laboratory fee.) Prereq. CHM 4262 or equiv.*

CHM 4271 Introduction to Immunodiagnostics* (3 q.h.)

Fundamentals of immunodiagnostics with emphasis on the application of principles to nursing, medical laboratory science, and biology. *Prereq. CHM 4113, BIO 4103 or equiv.*

CHM 4321 Instrumental Analysis 1 (3 q.h.)

Basic theory of electrochemistry and electrochemical methods of analysis, including electrode and cell potentials, potentiometric titrations, direct potentiometry (pH meters and specification electrodes), coulometry, voltammetry, polarography, electrogravimetry, and conductometric methods. *Prereq. CHM 4223 or equiv. (This course may serve as preparation for certain graduate courses.)*

CHM 4322 Instrumental Analysis 2 (3 q.h.)

Basic theory of absorption and emission spectroscopy, including ultraviolet and visible spectroscopy, molecular fluorescence and phosphorescence, atomic absorption spectroscopy (flame, arc, spark, and plasma), and infrared and X-ray spectroscopy. *Prereq. CHM 4321 or equiv. (This course may serve as preparation for certain graduate courses.)*

CHM 4323 Instrumental Analysis 3 (formerly Radiochemistry) (3 q.h.)

Topics covered include: x-ray spectroscopy, radiochemical methods, and chromatographic separations. Chromatographic separations include: chromatography, high performance liquid chromatography and planar chromatography. *Prereq. CHM 4322 or equiv. (This course may serve as preparation for certain graduate courses.)*

CHM 4371 Biochemistry 1 (3 q.h.)

Cellular organization, pH buffers, and the biochemistry of amino acids, proteins, enzymes, and vitamins. *Prereq. CHM 4263 or equiv.*

CHM 4372 Biochemistry 2 (3 q.h.)

Biochemistry of carbohydrates, lipids, and nucleic acids; bioenergetics; and the metabolism of carbohydrates. *Prereq. CHM 4371 or equiv.*

CHM 4373 Biochemistry 3 (3 q.h.)

Metabolism of lipids, amino acids, and nucleotides and the biosynthesis of proteins, DNA, and RNA. *Prereq. CHM 4372 or equiv.*

CHM 4381 Physical Chemistry 1 (3 q.h.)

Thermodynamics, thermochemistry, First and Second Laws, entropy, and free energy in spontaneous processes. *Prereq. CHM 4113 or equiv.*

CHM 4382 Physical Chemistry 2 (3 q.h.)

Chemical equilibria, acids and bases, electrochemistry, colligative properties, phase diagrams, thermodynamics of multicomponent systems, and kinetic molecular theory. *Prereq. CHM 4381 or equiv.*

CHM 4383 Physical Chemistry 3 (3 q.h.)

Kinetics, quantum chemistry, and photochemistry. *Prereq. CHM 4382 or equiv.*

CHM 4391 Introduction to Recombinant DNA Technology* (3 q.h.)

Principles of gene manipulation in bacteria and yeasts. Principles and methods of gene cloning and splicing.

CHM 4392 Affinity Chromatography in Biological Separations** (3 q.h.)

Principles and practice of affinity chromatography as utilized in separation and purification of biomolecules. *The required laboratory is CHM 4394, Lab for Affinity Chromatography. (Laboratory fee.) Prereq. CHM 4263 or equiv.*

CHM 4700 Advanced Tutorial 1 (4 q.h.)

Opportunity to take upper-level course independently. See page 23 for details. *Prereq. 87 q.h.*

CHM 4701 Advanced Tutorial 2 (3 q.h.)

See CHM 4700.

CHM 4801 Independent Study 1 (3 q.h.)

Opportunity to take special research. See page 24 for details. *Prereq. 96 q.h., 3.0 q.p.a.*

CRIMINAL JUSTICE

CJ 4101 Administration of Criminal Justice (3 q.h.)

Survey of the contemporary criminal justice system from initial contact with the offender

*Next offered Fall 1993.

**Next offered Fall 1994.

through prosecution, disposition, incarceration, and release to the community. Emphasis on major systems of social control: police, corrections, juvenile justice, mental health systems, and their policies and practices relative to the offender. Legal, empirical, and sociological materials covered.

CJ 4103 Criminology 1 (3 q.h.)

Classical and contemporary criminological theories. Examines their historical development and empirical bases, as well as their significance to the criminal justice process and the rehabilitation/deterrence/punishment of offenders.

CJ 4104 Criminology 2 (formerly Dimensions of Crime) (3 q.h.)

An examination of empirical knowledge about: the magnitude of the crime problem in the United States; characteristics of those who commit crimes; information about dangerous repeat offenders; characteristics of victims; and financial costs of crime to neighborhoods and communities. Assessment of the strengths and weaknesses of current crime measurement techniques, especially the Uniform Crime Reports and victimization surveys.

CJ 4106 Criminal Justice Research (3 q.h.)

A survey of methods for basic and applied research in criminal justice, combining statistical and research methods. Examines research techniques in criminal justice including interviews, questionnaires, observations, and scales for survey analysis. Issues of measurement and casual reasoning examined in regard to criminal justice research.

CJ 4107 Criminal Justice Statistics (formerly Criminal Justice Research 2) (3 q.h.)

Focuses on the uses of statistics, with special reference to use of data from the field of criminal justice. Covers basic descriptive statistics, including measures of central tendency, tests of significance, probability, sampling, and methods of forecasting. Concentrates on research application by stressing discussion of the general role of research in the discipline and specific contributions advanced by studies in the field.

CJ 4108 Criminal Law and Procedure 1 (3 q.h.)

Examination of the concepts, responsibilities, and liabilities of criminal law and procedure. Reviews the evolution of the criminal

law system. Topics include an analysis of substantive criminal law and the procedural process, as well as basic definitions; discussions of interaction between federal and state constitutions as they relate to criminal law.

CJ 4109 Criminal Law and Procedure 2 (3 q.h.)

Application of vital constitutional and statutory concepts, including selected statutory crimes, law of arrest, right to counsel, search and seizure, and applicable criminal procedures. Students are expected to be familiar with basic concepts as well as changing interpretations so that they can cite cases to support their conclusions. *Prereq.* CJ 4108.

CJ 4110 Constitutional Law (3 q.h.)

The history and development of the U.S. Constitution and Amendments using text commentary and case analysis. Topics include the Commerce Clause, procedural due process, state's rights, individual rights and civil liberties, the concept of federal supremacy, and state constitutions. *Prereq.* CJ 4109.

CJ 4114 Introduction to Law 1 (3 q.h.)

Provides an introduction to the law and the legal system of the United States. Sets forth the fundamentals of our legal process and provides a summary description of both the private and public law system. Presents an overview of the traditional structure, as well as the basic principles of law.

CJ 4115 Introduction to Law 2 (3 q.h.)

Continues the material presented in CJ 4114. Introduces basic tort and contract principles, administrative law, and governmental regulation of business, topics of particular concern to criminal justice professionals in both the public and private sectors, as well as to those students concentrating in legal studies. *Prereq.* CJ 4114.

CJ 4118 Juvenile Law (3 q.h.)

Introduces students to the fundamental case law and theory of Juvenile Law. Students study care and protection cases (commonly called abuse and neglect cases); delinquency proceedings; status offense cases, and transfer/waiver cases.

CJ 4201 Criminal Investigation 1 (3 q.h.)

The evolution of contemporary investigative techniques. Topics include investigative effectiveness and organization, and modern investigative techniques, especially as they relate to particular crimes such as arson, sexual offenses, larceny, burglary, robbery, forgery, and homicide.

CJ 4202 Criminal Investigation 2 (3 q.h.)

Continuation of Criminal Investigation 1. Focuses on staffing the investigation unit, informational management, control of evidence, establishment of investigative priorities, fiscal restraints, and the relationship between criminal investigation and patrol and special units. Examines special police operations such as electronic surveillance, raids, and undercover operations; affidavit construction, court preparation, and the use of scientific methods; and Federal law with regard to due process and other constitutional protections. *Prereq.* CJ 4201.

CJ 4203 Criminalistics 1 (3 q.h.)

Survey of the elements of microscopy, spectroscopy, and basic chemistry as they apply to the study of materials that comprise physical evidence. Covers the procedures for searching, sketching, and photographing crime scenes as well as the recognition, collection, marking, and handling of physical evidence, emphasizing the importance of maintaining the chemical integrity of each sample. Studies the types of analysis, their value and limitations with regard to glass, soil, hairs and fibers, firearms, toolmarks, and questioned documents.

CJ 4204 Criminalistics 2 (3 q.h.)

An introduction to the analysis of biological items of physical evidence collected at the scene of the crime or submitted for laboratory examination, and to the fields of serology and toxicology. Covers methods of collecting samples and the value of blood distribution patterns, as well as laboratory techniques used to identify and characterize blood stains and other body fluids. Pharmacology and toxicology of medical and chemical substances having potential for misuse and abuse are studied. Includes laboratory demonstrations and practical exercises to examine types of physical evidence, including gunshot residue, paints and polymers, and arson and explosive residues. *Prereq.* CJ 4203.

CJ 4207 Comparative Police Systems (3 q.h.)

Comparative study of police systems in Anglo-Saxon, Continental, Asian, Russian, African, and other cultural traditions with focus on the influence of nineteenth-century English and twentieth-century American police traditions on policing systems in other cultures and countries.

CJ 4209 Police Management 1 (3 q.h.)

Introduction to the philosophy and theories of management in policing. Historical view of the development of "professional/bureaucratic" managerial approach in policing. The development of organizational strategy; and understanding and managing the external environment within which police operate.

CJ 4210 Police Management 2 (3 q.h.)

Internal management of police organizations: policy development, implementation, maintenance of ongoing operations, and evaluation of program outcomes.

CJ 4211 Police and Social Problems (3 q.h.)

Investigation of police functioning with regard to contemporary social problems: drugs, prostitution, domestic assault, gangs, serial murderers, dangerous offenders, illegal aliens, and others, with a special focus on related research into police functioning.

CJ 4212 Police Community Relations (3 q.h.)

The role and function of police with both individuals and groups, including minority groups; police responsibilities regarding civil rights, civil disorders, and public protection.

CJ 4301 American Correctional System (3 q.h.)

A critical analysis of the American system of corrections. Covers important historical developments and the range of treatment and/or punishment options available to government, including prisons, jails, reformatories and community treatment programs. Probation and parole are considered as an integral part of corrections. Current correctional philosophy and treatment approaches on federal, state, and local levels of government are assessed. The interrelated nature of all aspects of corrections is emphasized, with particular focus on policy analysis and decision-making.

CJ 4302 Correctional Administration 1
(3 q.h.)

An intensive examination of the American correctional process. Programs, services, standards, methods of service delivery, and contracting procedures are analyzed. Critical issues in personnel administration and management are discussed, as are the allocation of scarce resources and staff development and training programs. Stresses motivation, productivity, and accountability in corrections and the role of community outreach and interface programs and volunteer services. *Prereq.* CJ 4301.

CJ 4303 Correctional Administration 2
(3 q.h.)

Continuation of intensive examination of the correctional process, with focus on special problems facing correctional administrators. Topics include the management of offenders with special needs (dangerous and/or violent offenders and inmates with histories of substance abuse); management and control of prison violence; and preventive techniques and programs. Also explored are institutional management of illegal immigrants and other special prisoners, as well as the special needs of female offenders. *Prereq.* CJ 4302.

CJ 4304 Jail Administration and Management (3 q.h.)

Study of local adult correctional institutions ranging from police lock-ups to jails and houses of corrections. Topics include administrative, management, and security issues; intake, regional, and network approaches; local versus state control; offender classification, programs, residential care, inspection, and standards; pretrial detention; staffing patterns; interface with courts and law enforcement; release programs; emergency management; and suicide prevention.

CJ 4305 Case Management and Correctional Services (3 q.h.)

An overview of treatment and rehabilitative work conducted in jail and prison environments. Basic counseling concepts and techniques, individual and group therapy, and institutional services are discussed. Case studies and class projects used to illustrate offender and inmate management in a variety of settings. Students study a range of innovative approaches in corrections and assess their fiscal and personnel requirements and effectiveness. *Prereq.* CJ 4301.

CJ 4307 The Rights of Offenders and Prisoners (3 q.h.)

Study of the rights of persons under correctional control. Examines traditional methods and assesses the magnitude and pace of judicial intervention in corrections. Topics include access to courts and legal services; health and medical care; searches; nondiscriminatory treatment; rehabilitation; retention and restoration of rights; rules of conduct, disciplinary procedures; grievance procedures; exercise of religious beliefs and practices; and remedies for violations of an offender's rights.

CJ 4309 Comparative Correctional Systems
(3 q.h.)

Correctional systems and practices in selected jurisdictions in the United States and other countries. Introduces students to innovative approaches in community corrections, local correctional institutions, prisons, alternatives to incarceration practices, rehabilitative and reintegrative programs, and improved management approaches. *Prereq.* CJ 4301.

CJ 4310 Community Corrections (3 q.h.)

The concept of community corrections from historical, philosophical, and pragmatic perspectives, and analysis of program options serving as alternatives to imprisonment or institutionalization. Discussions of program activities range from work and study release programs, family visiting furloughs, community-based correctional efforts aimed at helping offenders become law-abiding citizens. Topical issues include private and public programs, control and surveillance issues, residential and non-residential programs, marshalling and coordinating community resources, and volunteer involvement. Program and cost-effectiveness of community corrections, community safety, and managerial issues are also discussed. *Prereq.* CJ 4301.

CJ 4311 Probation and Parole (3 q.h.)

Introduction to probation and parole as dispositions, systems or subsystems, processes, and offender statuses. Includes the history of probation and parole, their conditions and revocation procedures, offender eligibility requirements, supervision styles, due process issues, and prediction and measurements of effectiveness. The role of volunteers, and probation and parole officer responsibilities also discussed. Introduces students to

presentence investigations, shock probation, probation subsidy, expansion of probation into pretrial and restitution programs, and to current debates on the governmental framework of probation and parole, parole boards, and parole hearings. *Prereq.* CJ 4301.

CJ 4403 Introduction to Security (3 q.h.)

The organization and administration of security and loss prevention programs in industry, business, and government. Emphasizes the protection of assets, personnel, and facilities, and the relations between security organizations and government agencies.

CJ 4404 Industrial Safety and Fire Prevention (3 q.h.)

Problems, methods, and technology in establishing safe working environments. Emphasizes the prevention of accidents and the effects of natural disasters with special focus on hazardous substance risks. *Prereq.* CJ 4403.

CJ 4406 Security Administration 1 (3 q.h.)

The historical basis of the security management function and the development of the field in general and its various specialties. Examines concepts of organizational security and risk-management methods. *Prereq.* CJ 4403.

CJ 4407 Security Administration 2 (3 q.h.)

Organization, administration, and management of the security function, including the systems approach to security operations. Focuses on planning, organizing, staffing, directing, controlling, representing and innovating. The manager's responsibility is also explored.

CJ 4408 Legal Aspects of Security Management and Operations (3 q.h.)

Provides a comprehensive examination of the legal environment and issues impacting security operations and management. Elements of criminal, civil, property, regulatory, and business law are analyzed from the perspective of organizational security management concerns. Includes legal basis of security practices, civil liability, corporate security, investigations, labor law, industrial espionage, governmental security issues, and other relevant topics. *Prereq.* CJ 4403.

CJ 4411 Electronic Information Security (3 q.h.)

Survey of the complex and developing security problems inherent in the use of electronic information systems. Provides a comprehensive examination of the management

methods and technology used to counter the security risks related to the use of computers, word processors, and other communication devices and methods. *Prereq.* CJ 4403.

CJ 4412 Computer Crime and Security (3 q.h.)

This course will analyze the current and future threats to computers and their users, and survey the security problems, technology, and methods used to protect these systems from external and internal violation.

CJ 4413 Industrial Security (3 q.h.)

For optimum success many manufacturers rely heavily on their own research and development organizations, just as they understand the importance of getting quality products to market ahead of their competitors. As a result, their security programs must take into account the protection of information along with the protection and conservation of all of their other assets. This course consists of an examination of the ways in which prevention oriented security programs can be integrated into all phases of the research and manufacturing processes, involve line managers and supervisors, and gain executive support by introducing cost effective, operationally sound methods to protect all assets.

CJ 4415 Service Industry Security (3 q.h.)

Consumer oriented activities, including such diverse businesses as the retailing and hospitality industries, are faced with the prospect of losses which can be caused by employees on one hand and the very consumers to whom they provide services on the other. They are in the unusual position of having to think in terms of image with regard to the general public's perception of how safe they are, and in terms of asset protection in as much as they are in business for profit. This course studies the ways in which a completely integrated security function, emphasizing prevention, can contribute to an employer's profit margins.

CJ 4417 Institutional Security (3 q.h.)

Institutions, whether academic such as colleges and universities, or medical centers, not only have much in common, but also they are unique in their security requirements since they often are nonprofit organizations which need a combination of business type security for the protection and

conservation of their assets, and policing to protect their census whether comprised of students, faculty, and staff, or patients, staff, and visitors. This course examines the ways in which their needs can best be satisfied through the combined use of modern technology, security personnel, and the integration of the security function into all facets of institutional management.

CJ 4420 Advanced Computer Applications in Criminal Justice (3 q.h.)

This course examines the role of computers as both a tool of law enforcement and as evidence of a crime. Building on basic computer literacy skills students will develop the necessary skills to safely and effectively analyze seized or down-loaded magnetic media, illustrate complicated criminal enterprises and the related financial transactions. Students will utilize IBM compatible personal computers with database, spreadsheet, flow charting and presentation graphic programs to analyze and present a case study. *Prereq.* COM 4101.

CJ 4503 Forensic Laboratory (3 q.h.)

A hands-on laboratory course focusing on individual experimentation. Surveys the basic examinations and techniques performed in a crime laboratory. Topics include general microscopy, hairs and fibers, blood and other body fluids, paint, glass, soil, fingerprints, gunshot residue, toxicology, questioned documents, and firearm and toolmark examinations. (*Laboratory fee.*) *Prereq.* CJ 4203 and CJ 4204.

CJ 4504 Juvenile Justice 1 (3 q.h.)

Examination of the contemporary juvenile justice system, with focus on the key decision points within the juvenile justice system including jurisdiction, police, detention, court intake, adjudication, disposition, and after-care. Critical issues facing the juvenile justice system components are discussed.

CJ 4505 Juvenile Justice 2 (3 q.h.)

Continuation of material discussed in CJ 4504. In particular, consideration is given to the history of juvenile justice in the U.S.; the major reforms of the juvenile justice system (diversion, the development of due process, decriminalization of status offenders, deinstitutionalization, and waiver to adult court); and future trends in juvenile justice. *Prereq.* CJ 4504.

CJ 4506 Crime Victims (3 q.h.)

Examination of current theories and research relating to victims of crime. Particular attention to special victim groups such as children, the elderly, and women. Victim interactions with the criminal justice system are explored. Current victim initiatives such as restitution, mediation, compensation, and victim rights legislation are also assessed. *Prereq.* CJ 4101 and CJ 4103.

CJ 4507 Organized Crime (3 q.h.)

The nature and problems of organized crime, its causes and effects, comparative and historic roots, and activities, organization, and economics. Considers possible solutions and the scope of techniques used in combatting organized crime.

CJ 4508 Crime Scene Investigation (3 q.h.)

A competent search of a crime scene demands specialized training. This course covers certain basic considerations, guidelines, and procedures that help the crime scene technician avoid oversight, ensure thoroughness of search, and comply with both the legal and scientific pertaining to the use of physical evidence. The procedures for recording the crime scene—i.e., notetaking, sketching, and photography—as well as the basic steps that minimize the omission or contamination of evidence are studied in detail.

CJ 4509 White-Collar Crime (3 q.h.)

Basic survey of white-collar crime: the nature and extent of white-collar crime, the social-psychological makeup of white-collar crime typologies, present efforts directed toward its control, and interagency and jurisdictional problems and the benefits of co-operation.

CJ 4510 Terrorism (3 q.h.)

An overview of terrorism and why it has become so popular. Topics include the role of news media, political consequences of terrorism, the military as a resource, and the role of the hostage.

CJ 4511 Survey of Criminal Evidence (3 q.h.)

The fundamentals of criminal trial procedure and the rules of evidence as they apply to the trial of a criminal case. Students read and brief criminal court cases. *Prereq.* CJ 4108 and CJ 4109.

CJ 4512 Women and the Criminal Justice System (3 q.h.)

Introduction to issues relating to roles taken by women involved with the criminal justice system and to the system's various responses to women in these roles. Specific focus on women as victims of crime, as offenders, and as practitioners.

CJ 4701 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 24.

CJ 4702 Independent Study 2 (3 q.h.)

See CJ 4701.

CJ 4703 Independent Study 3 (3 q.h.)

See CJ 4701.

CJ 4805 Advanced Tutorial 1 (3 q.h.)

Opportunity to take upper-level course independently. See page 23 for details.

CJ 4806 Advanced Tutorial 2 (3 q.h.)

See CJ 4805.

CJ 4811 Advanced Tutorial Intensive (6 q.h.)

Opportunity to take upper-level course sequence independently. See page 23 for details.

COMMUNICATION STUDIES

(formerly Speech Communication)

CMN 4001 Speaking Skills for International Students 1 (formerly SPC 4001) (3 q.h.)

Introductory instruction in pronunciation and intelligibility for formal and informal situations. Monitors communication skills through use of video and audiotape recordings and work in the language laboratory. Following diagnostic testing, students participate in individualized small- and large-group instructional situations. Placement tests are given during the first week of class.

CMN 4002 Speaking Skills for International Students 2 (formerly SPC 4002) (3 q.h.)

Intermediate-level course designed for persons who have previously studied English, but who need to develop oral communication proficiency. Monitors communication skills through use of video and audiotape recordings and work in the language laboratory. Following diagnostic testing, students

participate in individualized small- and large-group instructional situations. Placement tests are given during the first week of class.

CMN 4003 Speaking Skills for International Students 3 (formerly SPC 4003) (3 q.h.)

Advanced-level course designed for students who have previously studied English and who can make themselves understood easily, but who have difficulty conversing. Includes task-oriented interaction, a variety of two-person communication situations, and small-group interactions. Progress is monitored through use of video and audiotape recordings. Placement tests are given during the first week of class.

CMN 4101 Fundamentals of Human Communication (formerly SPC 4101 Effective Communication 1) (3 q.h.)

Introduction to development of personal communication skills, shaping messages, sending messages, listening, understanding nonverbal cues, trusting, giving and receiving feedback, interacting, and coping with the barriers to communication.

CMN 4102 Group Discussion (formerly SPC 4102 Effective Communication 2) (3 q.h.)

Topics include small-group communication, elements of group structure, task and maintenance functions, leadership, and formalized methods of group problem-solving and decision-making.

CMN 4104 Effective Communication (Intensive) (formerly SPC 4104) (6 q.h.)
Same as CMN 4101 and CMN 4102.

CMN 4111 Voice and Articulation (formerly SPC 4111) (3 q.h.)

Development of the speaking voice, with emphasis on articulation, pitch control, and vocal variety and flexibility. Includes basic theory of the vocal mechanism.

CMN 4112 Advanced Voice and Articulation (formerly SPC 4112) (3 q.h.)
Continuation of CMN 4111. *Prereq.* CMN 4111 or instructor's permission.

CMN 4150 Self-Concept and Communication (formerly SPC 4150) (3 q.h.)
Examination of the ways communication patterns are formed and how they work in our personal and professional lives. Emphasizes how self-concept affects communication. By combining thinking, feeling, and doing, students can develop awareness of

their attitudes and habits and explore alternative communication patterns.

CMN 4151 Listening (formerly SPC 4151)
(3 q.h.)

Analyzes listening effectiveness in professional and personal situations. Reasons for poor listening, techniques for effective listening, and giving and receiving feedback are covered.

CMN 4152 Interviewing (formerly SPC 4152)
(3 q.h.)

Topics include fundamental communication principles and how they apply to the interview process. Gives special attention to employment, information retrieval, and persuasive interviews.

CMN 4153 Techniques of Persuasion (formerly SPC 4153) (3 q.h.)

Covers communication strategies used when attempting to influence others. Examines instances of persuasion as they occur in advertising, politics, social interaction, sales, and business.

CMN 4154 Negotiation Skills (formerly SPC 4154) (3 q.h.)

Examination of skills involved in bringing matters to mutually acceptable settlements. Through lectures, discussions, case studies, and classroom activities, students explore conflict resolution in both personal and professional settings.

CMN 4155 Organizational Communication (formerly SPC 4155) (3 q.h.)

An exploration of communication management within organizations. Topics include the role of communication in management, the management and control of information flow, and strategic communication planning.

CMN 4160 Communication and the Media (formerly SPC 4160) (3 q.h.)

An overview of the structure, functions, and history of American mass media. Presents a basic understanding of the process of mass media as it intersects society in general, and the lives of individuals in particular.

CMN 4201 Argumentation (formerly SPC 4201) (3 q.h.)

Basic concepts of argumentation, such as evidence, research, and refutation, with emphasis on the psychology of the audience and various types of group discussion.

CMN 4221 Interpersonal Communications 1 (formerly SPC 4221)
(3 q.h.)

Examines ways of becoming more aware of one's self and one's relationship to others. Presents options for communicating and for increasing one's knowledge of the group process.

CMN 4222 Interpersonal Communications 2 (formerly SPC 4222)
(3 q.h.)

Continuation of CMN 4221. *Prereq.* CMN 4221 or instructor's permission.

CMN 4225 Family Communication (formerly SPC 4225) (3 q.h.)

Introduction to how communication affects the development and maintenance of family relationships. Topics include marital, parent/child, sibling, and extended family communication patterns; problem identification and problem-solving skills in family communication.

CMN 4231 Gender Communication (formerly SPC 4231 Female/Male Communication 1) (3 q.h.)

Examines ways in which female/male relations are created, maintained, developed, or dissolved through communication. Covers the influence of family, friends, the media, and "significant others" in sustaining stereotypes for both sexes and the impact of such stereotyping on the self and on effective communication. Also looks at the use of verbal and nonverbal communication to understand the types of relationships between men and women and how different female/male language styles affect these relations.

CMN 4240 Managing Interpersonal Conflict (formerly SPC 4240) (3 q.h.)

Basic concepts involved in the management of conflict in interpersonal situations, such as understanding attitudes about conflict, studying message patterns in conflict interactions, and exploring a variety of conflict resolution methods.

CMN 4241 Professional Selling Skills (formerly SPC 4241) (3 q.h.)

Provides students with the opportunity to develop an effective sales climate and strategies. Basic concepts involved in the sales process, including referral and nonreferral prospecting, planning, meeting the prospect, assessing the prospect's situation and goals,

proposing solutions, dealing with apathy and negativism, closing the sale, and assuring customer satisfaction.

CMN 4251 Business and Professional Speaking (formerly SPC 4251) (3 q.h.)
Covers practice in the organization and presentation of material to fit varying audiences. Emphasizes delivery techniques and effective presentation of ideas.

CMN 4252 Special Topics in Communication (3 q.h.)
Examination of a variety of subjects and themes in communication studies. Since topics change from quarter to quarter, students may take this course more than once, provided they focus on a different topic each time.

CMN 4260 Communication Research Methods (formerly SPC 4260) (3 q.h.)
This course provides an overview of the research process and examines various types of research methods as they relate to the study of human communication.

COMPUTER LITERACY

COM 4101 Foundations of Computer Literacy (4 q.h.)
Introduction to computers, including database management, word processing, systems analysis and design, software packages, artificial intelligence, and trends in specialized types of office automation. Hands-on laboratories reinforce lectures.

COUNSELING, PSYCHOLOGY REHABILITATION, AND SPECIAL EDUCATION

CRS 4200 Introduction to Special Education (3 q.h.)
Surveys the characteristics and the social, emotional, and educational adjustment of children and youth with special needs. Examines the effects of the disability, and of the individual's and society's attitudes toward the disability. Reviews current legislation.

DRAMA

DRA 4101 Introduction to Theatre (3 q.h.)
How a theatrical performance is made through the eyes of those who make it: writers, producers, actors, designers, and audience. Designed to increase the student's awareness of theatre as a business as well as to provide a basis for enjoyment of theatre as an art form dealing with ideas and emotion. Visits to local theatres and viewing of performances in the Boston area. Guest lectures by practicing professionals. Cost of theatre tickets not included in tuition.

DRA 4120 Acting for the Non-Actor (3 q.h.)
Shakespeare said "All the world's a stage..." We are all actors in our private and professional lives. Basic acting principles and performance experiences can benefit anyone who interacts with other people. This course deals with stress, relaxation, presentation of self, status in relationships, and performance anxieties. Acting exercises assist the student in finding methods for dealing comfortably and positively with real-life situations.

DRA 4140 Introduction to Acting 1 (formerly Workshop for the Actor 1) (3 q.h.)
Physical preparation for the actor, including basic stage movement and deportment, control of the stage voice, analysis and establishment of characterization through observation and awareness of the body, and improvisations and short scenes.

DRA 4141 Introduction to Acting 2 (formerly Workshop for the Actor 2) (3 q.h.)
Psychological preparation for the actor, including analysis and establishment of characterization through memory, emotion, imagination, and recall; analysis of specific roles; the creation of a character analysis book; and improvisations and short scenes.
Prereq. DRA 4140 or instructor's permission.

DRA 4142 Acting 3 (formerly Workshop for the Actor 3) (3 q.h.)
Preparing and performing the role, including the physical and psychological preparation of specific roles. Also includes short classroom scenes and the presentation of a one-act play. *Prereq.* DRA 4141 or instructor's permission.

DRA 4145 Auditioning for the Stage (3 q.h.)
Focuses on techniques, approaches, and attitudes that assist the actor in the casting process. Preparation for and presentation of monologues. *Prereq.* DRA 4142 or instructor's permission.

DRA 4150 Introductory Mime Workshop (3 q.h.)
In-depth introduction to mime, featuring illusionary technique, silent acting, and the creation of material for mime theatre.

DRA 4151 Acting for the Camera (Studio)* (3 q.h.)
The adaptation of theatre acting techniques to the camera. In-studio experiences relative to the performer's physical and vocal persona in creating a character, developing the role and revealing the personality. On-camera involvement in short dramatic pieces. *(Laboratory fee.) Prereq.* DRA 4140 and 4141 or instructor's permission.

DRA 4152 Acting for Commercials (Studio)* (3 q.h.)
Understanding the "art" of movement and gesture in commercials; with commercial terminology and procedures; with manipulating commercial dialogue as well as handling the "product." In-studio/on-camera practice with commercial scripts. *(Laboratory fee.) Prereq.* DRA 4151 or instructor's permission.

DRA 4153 Acting for Voice Overs (Studio)* (3 q.h.)
The use of the voice for "selling" a product or service. Understanding microphone and sound booth techniques. Developing your own "voices"; analyzing commercial dialogue and speaking it effectively. *(Laboratory fee.) Prereq.* DRA 4152 or instructor's permission.

DRA 4154 Advanced Camera and Microphone Techniques (Studio)* (3 q.h.)
This course is for the experienced actor wishing to further develop on-camera and voice-over skills for commercial and industrial performances. Classes are held in the TV Studio and all work is taped. Students will have their own tapes for personal evaluations. *(Laboratory fee.) Prereq.* DRA 4153 or instructor's permission.

DRA 4155 Puppetry Workshop (Studio)* (formerly Puppetry) (3 q.h.)
Students will design and construct a hand puppet and practice puppet manipulation,

and will discuss and engage in writing and acting for puppet theater. The uses of puppetry past and present will be discussed. The emphasis will be on creating and performing. *(Laboratory fee.)*

DRA 4230 The Boston Theatre Scene (3 q.h.)
Opportunity to view and critique live performances presented in the Boston area's major and "off-Broadway" theatres. Cost of theatre tickets not included in tuition.

DRA 4250 Theatre Movement (3 q.h.)
Deals with relaxation, concentration, and the use of the body to free the emotional self.

DRA 4260 Theatre Speech (3 q.h.)
Focuses on vocal technique and speech problems unique to actors performing in contemporary and classical theatre.

DRA 4815 Advanced Tutorial 1 (3 q.h.)
Opportunity to take an upper-level course independently. See page 23 for details.

DRA 4816 Advanced Tutorial 2 (3 q.h.)
See DRA 4815.

ECONOMICS

ECN 4001 Overcoming Statistics Stress (noncredit)
This seminar is designed to show students how to put aside anxieties by understanding the components of statistics and developing techniques to simplify seemingly difficult word problems. Mathematical skills needed include addition, subtraction, division, multiplication, knowledge of square roots, and basic algebra.

ECN 4115 Economic Principles and Problems 1 (3 q.h.)
Application of the basic principles of economics to current public problems. Focusing on macroeconomics, students explore unemployment, inflation, national income and employment theory, and government expenditures and taxation.

ECN 4116 Economic Principles and Problems 2 (3 q.h.)
Continuation of ECN 4115, focusing on the role of the banking system, the Federal Reserve System, and supply-side policies. Topics in microeconomics include the role of a

**Courses designated "(Studio)" meet for 3 1/2 hours.*

market pricing system; supply and demand, the costs of production; profits; and the supply decision. *Prereq.* ECN 4115 or *equiv.*

ECN 4117 Economic Principles and Problems 3 (3 q.h.)

Continuation of ECN 4116, focusing on markets and the allocation of resources. Topics include competitive markets, monopoly, oligopoly, factor markets, and income distribution. Economic principles are applied to selected problem areas, including poverty, pollution, energy, international trade, and the balance of payments. *Prereq.* ECN 4116 or *equiv.*

ECN 4118 Economics (Intensive) (9 q.h.)

Same as ECN 4115, ECN 4116, and ECN 4117.

ECN 4130 Medical Economics (3 q.h.)

Topics include health care trends in the United States; causes for increases in medical care costs; supply and training of health care personnel; the nation's need for physicians, nurses, pharmacists, and other allied health personnel; the quality of medical care; economics of health insurance plans; and consumer demand for health care, medical facilities, and professional and semiprofessional personnel.

ECN 4137 History of Economic Thought (3 q.h.)

Development of economic thought, including Mercantilism as the first economic doctrine; analysis of the older, classical school with its later refinements (Modern Marginalism) and its important critics (socialists, Marxists); and Keynesian and modern developments.

ECN 4140 Economics of Crime (3 q.h.)

Theoretical and empirical analyses of the economic causes of criminal behavior. The social costs of crime, its prevention, and techniques for designing optimum law enforcement policies.

ECN 4150 Energy Economics (3 q.h.)

Economic, political, and historical background of energy and other resource problems, including examination of the future impact of primary resource limitations on U.S. and world economics and feasibility studies of resource substitution.

ECN 4215 Macroeconomic Theory 1 (3 q.h.)

A discussion of conceptual and empirical problems of creating and using national ac-

counts, price index problems, conceptual and empirical evaluation of consumption and investment functions and their policy implications, multiplier and accelerator models, and recent cyclical fluctuations. Analyzes theories of inflation, unemployment, and growth in light of recent economic history. *Prereq.* ECN 4117 or *equiv.*

ECN 4216 Microeconomic Theory 1 (3 q.h.)

Examines supply and demand analysis, various elasticity concepts and applications, theories of demand and production, and derivation of cost curves. Analyzes pricing and output behavior in several market structures. Analyzes the pricing of resources, general equilibrium and economic efficiency, and a variety of topics in microeconomics such as externalities and public goods. *Prereq.* ECN 4117 or *equiv.*

ECN 4217 Macroeconomic Theory 2 (3 q.h.)

A continuation of ECN 4215.

ECN 4218 Microeconomic Theory 2 (3 q.h.)

A continuation of ECN 4216.

ECN 4219 Selected Topics in Economics (3 q.h.)

Studies in a variety of macro- and microeconomic issues. Because topics change from quarter to quarter, students may take this course more than once, provided they focus on a different topic each time.

ECN 4250 Statistics 1 (3 q.h.)

Introduction to the collection and organization of data, including the measurement, presentation, and uses of elementary set theory; measures of central tendency and variability; basic probability; and probability distributions.

ECN 4251 Statistics 2 (3 q.h.)

Sampling and basic estimation techniques, "t" distribution, testing of statistical hypotheses, and analysis of variances. *Prereq.* ECN 4250 or *equiv.*

ECN 4252 Statistics 3 (3 q.h.)

Methods of econometric estimation and forecasting, including linear regression analysis, correlation analysis, time series analysis, and index numbers. *Prereq.* ECN 4251 or *equiv.*

ECN 4253 Statistics Intensive A (formerly Statistics Intensive) (9 q.h.)

Same as ECN 4250, ECN 4251, and ECN 4252.

ECN 4254 Statistics Intensive B (6 q.h.)
Same as ECN 4250 and ECN 4251.

ECN 4255 Hands-On Statistics (4 q.h.)
Statistics techniques and applications, including frequency distributions, measures of central tendency, measures of dispersion, probability and probability distributions, and sampling and estimation techniques. Class time is divided equally into lecture and laboratory; the latter focuses on individual, supervised problem-solving. *Not open to students who have taken ECN 4250.*

ECN 4310 Labor Economics (3 q.h.)
Economic analysis of the labor market, including the labor force, the demand for labor, and the institutions and policies dealing with them. Examines employment, unemployment, wage determination, and the development and efficient use of labor resources as well as collective bargaining issues and their economic consequences. *Prereq. ECN 4117 or equiv.*

ECN 4311 Human Resource Planning (3 q.h.)
Assessment of government and private efforts to fight poverty and improve the labor market position of impoverished groups. Considers the relationship between causes of poverty and discrimination and possible remedies. Also considers training programs, negative income tax, family allowances, and other income maintenance schemes.

ECN 4312 Economic Concerns of Older Adults (3 q.h.)
Designed to provide a basic knowledge of economic principles as they apply to senior members of the community. Includes how the U.S. economic policies and market system determine the price, quality, and availability of medical care and other allied services.

ECN 5312 Economic Concerns of Older Adults (3 CEUs)
Same as ECN 4312.

ECN 4313 Women in the Labor Force (3 q.h.)
Economic analysis of women's labor market position in the context of the changing economic structure and labor market institutions. Analysis of female labor force participation differences; male-female differentials in earnings and unemployment; occupational

concentration, occupational segregation; theories and evidence of sex discrimination; and new opportunities for women.

ECN 4315 Income Inequality and Discrimination (3 q.h.)
Analysis of the composition of impoverished groups and recent trends. Examines the labor market, demographic and institutional forces contributing to poverty, the role of education, the economics of race and sex discrimination, the public welfare system, and proposed reforms.

ECN 4321 Urban Economic Problems and Policies (3 q.h.)
Economic analysis of selected urban problems such as housing, poverty, transportation, education, health, crime, and the urban environment. Includes discussion of public policies relating to such problems.

ECN 4322 Economics of Transportation (3 q.h.)
Transportation and land-use patterns, ownership, regulations, financing, social costs and benefits of various modes of transportation, and economies of new technology.

ECN 4323 Environmental Economics (formerly Economics of the Quality of Urban Environment and Control) (3 q.h.)
Economic analysis of air, water, thermal, and noise pollution. The utilization of urban space and other urban resources; identification of possible economic effects of urban environment, such as crime, delinquency, immobility, and congestion.

ECN 4330 Economic Growth and Development (3 q.h.)
Prospects for economic growth and development in impoverished nations as indicated by economic analysis and historical experience. Includes the social, cultural, and institutional determinants of growth and an analysis of agriculture and development.

ECN 4331 American Economic History (3 q.h.)
Economic development of the United States, with emphasis on the post-Civil War period and the effect of certain European developments.

ECN 4333 European Economic Development (3 q.h.)
Historical survey of European economic development from overseas expansion to the

dissolution of empires and the Common Market. Examines the environmental impact of industrialism and the implications of living in a technological society.

ECN 4334 Comparative Economic Systems (3 q.h.)

Competing types of theoretical economic systems; analysis of the organization and operation of currently existing types of communist, socialist, and capitalist economies; and comparison and evaluation of the economic behavior and performance of different economic systems.

ECN 4335 International Trade (formerly International Economics 1) (3 q.h.)

Economics of international trade including tariffs, use of resources, and balance-of-payment mechanisms. *Prereq. ECN 4117 or equiv.*

ECN 4336 International Monetary Economics (formerly International Economics 2) (3 q.h.)

International commercial policy, financial organizations, and recent problems. *Prereq. ECN 4335 or equiv.*

ECN 4337 International Economics (Intensive) (6 q.h.)

Same as ECN 4335 and ECN 4336. *Prereq. ECN 4117 or equiv.*

ECN 4341 Money and Banking Intensive (6 q.h.)

Same as ECN 4342 and 4343. *Prereq. ECN 4117 or equiv.*

ECN 4342 Money and Banking 1 (3 q.h.)

Introduction to money and credit, commercial banking structure, and money creation as well as the problems and policies of centralized banking in the United States. *Prereq. ECN 4117 or equiv.*

ECN 4343 Money and Banking 2 (3 q.h.)

Topics include theory of money, prices, and monetary policy; interest theory; debt management; and international monetary problems and analysis. *Prereq. ECN 4342 or equiv.*

ECN 4344 Government Finance (3 q.h.)

Topics include fiscal functions, institutions, and politics; growth of the public sector; expenditure planning in theory and practice; cost-benefit analysis; principles of taxation and tax incidence; major taxes at federal, state, and local levels; fiscal policy for high employment, price stability and growth; and

current fiscal problems, such as tax reform, urban fiscal problems, fiscal federalism, and income maintenance programs. *Prereq. ECN 4117 or equiv.*

ECN 4345 Business Cycles and Inflation (formerly Business Cycles 1) (3 q.h.)

Considers the theories of business cycles and inflation and an empirical application of these theories to current business cycles, inflation, and stagflation problems. *Prereq. ECN 4117 and ECN 4215.*

ECN 4350 Introduction to Econometrics (3 q.h.)

Methods of econometric estimation and forecasting, including various statistical techniques. Students are given the opportunity to construct their own models and use computer facilities for estimation and forecasting. *Prereq. ECN 4117 and ECN 4252.*

ECN 4351 Problems in Economic Research (3 q.h.)

Research methods used by practicing economists. Topics include typical problems from areas of applied economics, such as choices of modeling framework, development of static and dynamic adaptive policy models, problems of data collection, review of estimation techniques, and interpretation of results. *Prereq. ECN 4117 and ECN 4252.*

ECN 4353 Introduction to Mathematical Economics (3 q.h.)

Introduction to mathematical analysis, with an in-depth study of theory of distribution. *Prereq. ECN 4117 or equiv.*

ECN 4360 Managerial Economics (3 q.h.)

Theory of demand, price, and output as applied to business firms and capital budgeting. *Prereq. ECN 4117 or equiv.*

ECN 4362 Industrial Organization and Public Policy (3 q.h.)

Theoretical framework for analysis and evaluation of the static and dynamic performance of real markets. Examines empirical studies that test the usefulness of applying theory to real markets and the existence of antitrust laws as a public policy designed to promote better market performance. *Prereq. ECN 4117 or equiv.*

ECN 4363 Government and Business 1 (3 q.h.)

The rationale for government involvement in markets, the role of government in na-

tional economic affairs, and the relationship between government and business, including the application of antitrust laws to business.

ECN 4364 Government and Business 2 (3 q.h.)

The government's role in economic activities. The relationships between the government and industry, labor, agriculture, public utilities, and consumers. The changing role of government from laissez-faire policy to direct intervention in the economy. Wage and price controls, environment and anti-pollution policies, consumer protection, conglomerate mergers, and regulation of industries.

ECN 4384 The Economics of the Stock Market (3 q.h.)

Topics include the organization of the stock exchange, the highly speculative nature of the stock exchanges, the functions of the exchanges, capital gains, equity, dividends, stock options, splits, puts and calls, the crash of 1929, the crash of 1987, the Great Depression, controls on the stock market, and the Federal Reserve Board.

ECN 4492 Economic Policy Seminar (3 q.h.)
Most advanced course for senior economic majors, with emphasis on independent study and contemporary issues. *Prereq.* ECN 4215 and ECN 4216.

ECN 4495 Honors Program 1 (4 q.h.)
Opportunity to undertake an in-depth research study project. See page 24 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

ECN 4496 Honors Program 2 (4 q.h.)
See ECN 4495.

ECN 4497 Honors Program 3 (4 q.h.)
See ECN 4495.

ECN 4500 Advanced Tutorial 1 (3 q.h.)
Opportunity to take an upper-level course independently. See page 23 for details. *Prereq.* 87 q.h.

ECN 4501 Advanced Tutorial 2 (3 q.h.)
See ECN 4500.

ECN 4510 Independent Study 1 (3 q.h.)
Opportunity to undertake special research. See page 24 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

ECN 4511 Independent Study 2 (3 q.h.)
See ECN 4510.

ECN 4512 Independent Study 3 (3 q.h.)
See ECN 4510.

ECN 4601 Economics 1 (4 q.h.)
Development of macroeconomic analysis, review of national income concepts, national income determination fluctuation and growth, the role of the banking system and the Federal Reserve system, government expenditures and taxation, international trade, and balance of international payments. *For Alternative Freshman-Year students only.*

EDUCATION*

ED 4001 Integrated Language Skills Development 1 (2 q.h.)

Strives to improve a student's reading comprehension and related study and language skills. Devotes time, discussion, and considerable practice to meaningful skills such as basic reading comprehension and interpretation, including work in critical reading and other interpretational acts (inferences, understanding imagery, and symbolic usage). Focuses on study skills, reviewing, finding main ideas and details, outlining and summarizing, continuous interaction, and interaction of all the communications skills—reading, writing, listening, and speaking. *For Alternative Freshman-Year students only.*

ED 4002 Integrated Language Skills Development 2 (2 q.h.)

Continues discussion of topics introduced in ED 4001. *For Alternative Freshman-Year students only. Prereq.* ED 4001.

ED 4003 Integrated Language Skills A (4 q.h.)

Strives to improve a student's reading comprehension and related study and language skills. Devotes time, discussion, and considerable practice to meaningful skills such as basic reading comprehension and interpretation, including work in critical reading and other interpretational acts (inferences, understanding imagery, and symbolic usage).

*For Introduction to Special Education, see CRS 4200, page 174.

Focuses on study skills, reviewing, finding main ideas and details, outlining and summarizing, continuous interaction, and interaction of all the communications skills—reading, writing, listening, and speaking. *For Alternative Freshman-Year students only.*

ED 4004 Integrated Language Skills B (4 q.h.)

Extends ED 4003, with continued emphasis on study skills, including researching, organizing, and writing term papers. Explores critical thinking as it relates to the learning process. Also addresses the choices of academic major and career direction, emphasizing self-assessment and personal decision-making. *For Alternative Freshman-Year students only. Prereq. ED 4003.*

ED 4050 College Reading and Study Skills (3 q.h.)

Reading comprehension, text and lecture note-taking skills, and examination-taking skills. Students practice with excerpts from texts and taped lectures, and apply the skills to materials in other courses. Intended for students who are beginning college work and wish to develop reading and study skills. *(Not for students who have already taken the Basic Day College courses Reading/Study Skills 1 or Integrated Language Skills Development 1.)*

ED 4101 Introduction to Education (3 q.h.)

Examines theories about the nature of teaching and learning. Evaluates the effects of traditional and innovative educational systems on learners. Considers the needs of the learner and the role of school and teacher.

ED 4102 Child Development and Learning (3 q.h.)

Surveys principles of child development from the pre-natal period through pre-adolescence. Examines learning and development in the context of relevant theory. Considers educational implications.

ED 4103 Adolescent Development and Learning (3 q.h.)

Examines social, emotional, and intellectual development in the adolescent years. Studies problems in the adolescent's family and social environments and in school adjustments.

ED 4406 Elementary Curriculum I: Language Arts; Art; Music (3 q.h.)

This course examines the expressive components of a comprehensive and integrated language arts curriculum. Students will be

involved in the process of learning how to integrate speaking, listening, visual arts, and music/movement experiences in developing curriculum for children at various stages of development. Students will analyze how the expressive aspects of curriculum relate to critical thinking, problem solving, and literacy improvement.

ED 4407 Elementary Curriculum II: Social Studies (3 q.h.)

Describes and evaluates social studies curricula in use in the elementary school. Develops criteria to select appropriate social studies content, skills, and attitudinal objectives. Expects students to use these criteria to develop social studies experiences that meet the developmental needs of learners in a multicultural society.

ED 4408 Elementary Curriculum III: Science and Mathematics (3 q.h.)

Surveys methods and materials for teaching elementary school science and mathematics. Students will examine curricula, related mathematics and science content, and strategies and materials for teaching in a manner that takes into account the developmental stages of children.

ED 4410 General Teaching Methods for High School (3 q.h.)

Considers methods and materials appropriate to teaching adolescents. Examines various models and strategies of instruction. Students will plan curricula and incorporate essential features of effective curriculum and teaching plans. The course seeks to encourage attitudes identified with tenets of good teaching.

ED 4411 a, b, c, d Teaching in the High School: (a) mathematics; (b) science; (c) English; (d) history and social sciences (3 q.h.)

Examines the teaching of specific subject areas in the high school. Topics include organizing and presenting lessons, developing teaching materials, using instructional technology, and developing and implementing evaluation instruments. Students will examine the current curriculum resources in their subject areas.

ED 4412 Curriculum Development in the High School (3 q.h.)

Examines how goals and objectives are selected and how priorities are determined. Considers how educational programs are

designed to meet goals, and how educational outcomes are evaluated. Compares different approaches to organizing learning experiences.

ED 4415 Reading/Learning Problems in Secondary School (3 q.h.)

Examines developmental and corrective reading/literacy programs at the secondary school level. Examines the development of reading rate, comprehension, and study skills in the content areas. Introduces formal and informal methods for assessing reading and writing ability.

ED 4426 Fundamentals of Reading (3 q.h.)

Considers reading as an aspect of language. Examines the major growth areas of reading and how reading acquisition is facilitated by developmental instruction. Considers major approaches to instruction in a whole language and experientially integrated environment. Also considers other aspects of literacy development.

ED 4801 Field Experience 1 (1 q.h.)

Teacher certification students are required to fulfill three fieldwork placements of 25 hours each while in the program of study. The placements are in schools at the level and in the area of certification. Students will observe teaching and fulfill field experience requirements as assigned. *Prereq. ED 4101.*

ED 4802 Field Experience 2 (1 q.h.)

See ED 4801. *Prereq. ED 4101.*

ED 4803 Field Experience 3 (1 q.h.)

See ED 4801. *Prereq. ED 4101.*

ED 4817 Student Teaching Practicum (8 q.h.)

Allows for full-time participation in a University-arranged and supervised school program designed to analyze learning and teaching and to demonstrate, evaluate, and develop teaching skills. *Prereq. Formal acceptance into program and completion of advanced professional sequence and field experience with a QPA of at least a 2.000 in all professional courses and a minimum overall QPA of 2.500.*

EMERGENCY MEDICAL SERVICES

EMS 4107 EMT-Basic (9 q.h.)

The course covers evaluation and management of the following medical emergencies; cardiopulmonary arrest, severe bleeding and

shock; fractured bones; care for heart attack, stroke, burn and poisoning victims; extrication and removal of victims from crashed vehicles and collapsed buildings; emergency childbirth and various other medical, emotional, and environmental emergencies.

EMT-Basic includes: 6 hours of class weekly for 12 weeks. Four (4) all day Saturday exercises (combination of indoor and outdoor) that include practical demonstration of ambulance and/or emergency vehicles and techniques. Ten (10) hours of in-hospital emergency room observation.

EMT Basic Skills: CPR (cardiopulmonary resuscitation), obstructed airway maneuvers, control of bleeding, taking vital signs (pulse/respiration/blood pressure), patient assessment, bandaging and splinting, emergency carries and lifting and moving devices (ambulance and orthopedic stretchers, etc.), triage at multi-victim accident.

EMS 4117 Emergency Medical Services 1 (4 cl., 6 lab., 6 q.h.)

Introduction to the Paramedic Program: role and responsibilities of Paramedics, medical terminology, human systems, patient assessment, blood, fluids and electrolytes, shock and shock management. The laboratory component provides the opportunity to correlate didactic knowledge while developing psychomotor skills. *To receive credit for this course, you must also register for BIO 4178.*

EMS 4118 Emergency Medical Services 2 (4 cl., 6 lab., 6 q.h.)

Continuation of Paramedic Program: respiratory system, cardiovascular system, pathophysiology and emergency management, electrocardiograms, life-threatening dysrhythmias. The laboratory component provides the opportunity to correlate didactic knowledge while developing psychomotor skills. *Prereq. EMS 4117 or equiv.*

EMS 4119 Emergency Medical Services 3 (4 cl., 6 lab., 6 q.h.)

Continuation of Paramedic Program: central nervous system, soft tissue injuries, musculoskeletal system, medical emergencies, acute abdomen, genitourinary system, geriatric emergencies. The laboratory component provides the opportunity to correlate didactic knowledge while developing psychomotor skills. *To receive credit for this course, you must also register for BIO 4179. Prereq. EMS 4118 or equiv.*

EMS 4120 Emergency Medical Services 4
(4 cl., 6 lab., 6 q.h.)

Continuation of Paramedic Program: obstetric/gynecologic emergencies, including emergency childbirth, neonatal and pediatric patients, emotionally disturbed patients, stress management, gaining access and extrication, multiple casualty incidents, emergency communications. The laboratory component provides the opportunity to correlate didactic knowledge while developing psychomotor skills. *Prereq. EMS 4119 or equiv.*

EMS 4121 Emergency Medical Services 5
(27.5 lab., 11 q.h.)

Clinical Practicum I of the Paramedic Program: application of theoretical knowledge and psychomotor skills in hospital unit rotations. *Prereq. EMS 4120 or equiv.*

EMS 4122 Emergency Medical Services 6
(27.5 lab., 11 q.h.)

Clinical Practicum II of the Paramedic Program. *Prereq. EMS 4121 or equiv.*

EMS 4123 Emergency Medical Services 7
(100 lab., 3 q.h.)

Field internship component of the Paramedic Program: opportunity to practice and develop all necessary psychomotor skills on an urban advanced life support system. *Prereq. EMS 4122 or equiv.*

ENGLISH

ENG 4005 Introduction to English as a Second Language (noncredit)

Introduction to the grammar and rhetoric of English as a second language. Practice in listening, speaking, and writing, with selected readings and exercises for improving vocabulary and pronunciation. *(May not be used to satisfy ENG elective requirements for English BA/BS degrees.)*

ENG 4006 Intermediate English as a Second Language (noncredit)

Intermediate course in English as a second language. Practice in preparing written and oral reports, including business and social letters. *(May not be used to satisfy ENG elective requirements for English BA/BS degrees.) Prereq. ENG 4005 or equiv.*

ENG 4007 Advanced English for International Students (3 q.h.)

Advanced course in English as a second language. Practice in special forms of writing to improve clarity, syntax, and organization.

(May not be used to satisfy ENG elective requirements for English BA/BS degrees.) Prereq. ENG 4006 or instructor's permission.

ENG 4011 Elements of Writing (3 q.h.)

Review of the structural patterns of current English. Practice in writing sentences, paragraphs, and short papers. *(May not be used to satisfy ENG elective requirements for English BA/BS degrees.)*

ENG 4012 Elements of Grammar (3 q.h.)

A study of grammar and the way the English language works. Helps students improve their writing through an understanding of the parts of speech, the mechanics of punctuation, and the vagaries of spelling. Exercises in solving problems of number, case, tense, degree, and usage. *(May not be used to satisfy ENG elective requirements for English BA/BS degrees.)*

ENG 4013 Fundamentals of English 1 (4 q.h.)

Intensive introduction to the principles of effective expository writing, emphasizing description, paragraph construction, and organization. Includes a review of the conventions of English usage, punctuation, and syntax. Essay assignments. *For Alternative Freshman-Year students only.*

ENG 4014 Fundamentals of English 2 (4 q.h.)

Intensive instruction in exposition, argument, and academic essay and research paper writing, in addition to continued study of the conventions of English usage, punctuation, and syntax. Essay assignments. *For Alternative Freshman-Year students only. Prereq. ENG 4013 or equiv.*

ENG 4100 Critical Writing 1 (formerly ENG 4110 3 q.h.) (4 q.h.)

Detailed examination of the principles and methods of rhetoric, especially narration, description, and exposition. Includes frequent practice in writing paragraphs and themes in those modes. *A writing proficiency test is given at the first class meeting.*

ENG 4111 Critical Writing 2 (3 q.h.)

Continued examination of the principles and methods of rhetoric, especially persuasion and argument, the study of short fiction, and the development of research skills. Includes practice in writing persuasive and critical themes and in preparing research papers. *Prereq. ENG 4110 or equiv.*

ENG 4112 Critical Writing 3 (formerly Approaches to Literature) (3 q.h.)
Further refinement of writing and analytical skills through the study of drama and poetry. Practice in writing longer critical papers. *Prereq.* ENG 4111 or equiv.

ENG 4120 English Literature: Faith and Humanism (3 q.h.)
English literature from its beginnings to 1700, including works by Chaucer, Spenser, Shakespeare, Donne, and Milton.

ENG 4121 English Literature: Reason and Romanticism (3 q.h.)
English literature from the Neoclassical period to the Romantic age, including works by Pope, Swift, Johnson, Blake, Wordsworth, and Keats.

ENG 4122 English Literature: Victorians and Moderns (3 q.h.)
English literature from the Victorian Age through the twentieth century, including works by Browning, Arnold, Hardy, Yeats, and Eliot.

ENG 4123 Early American Literature: Faith, Reason, and Nature (3 q.h.)
American literature from its beginnings through the nineteenth-century Transcendentalists, including works by Bradstreet, Taylor, Edwards, Franklin, Emerson, and Thoreau.

ENG 4124 American Romantics and American Realists (3 q.h.)
The fiction and poetry of nineteenth-century America, including works by Hawthorne, Melville, Whitman, Dickinson, Twain, James, Crane, and Dreiser.

ENG 4125 American Literature: The Modern Temper (3 q.h.)
The prose and poetry of twentieth-century America, including works by Eliot, Stevens, Fitzgerald, Hemingway, Wright, and Plath.

ENG 4131 God, Gods, and Heroes: The Literature of the Ancient and Medieval Worlds (3 q.h.)
Literary traditions of the ancient world and the Middle Ages in the works of such writers as Homer, Aeschylus, Sophocles, Euripides, Aristophanes, Virgil, and Dante, as well as in the art of biblical narrative.

ENG 4132 Man, Reason, and Imagination: Literature from the Renaissance to the Romantic Age (3 q.h.)
Literary traditions of the Renaissance, Neoclassicism, and Romanticism in the work of such writers as Machiavelli, Moliere, Racine, Voltaire, and Goethe.

ENG 4133 Order and Disorder: Literature of the Moderns (3 q.h.)
Literary traditions of Realism and Modernism in the work of such writers as Dostoevsky, Ibsen, Mann, Kafka, and Sartre.

ENG 4210 Science Fiction (3 q.h.)
Myths and rhetorical strategies of science fiction, including such novels as *Frankenstein*, *Childhood's End*, and *Stranger in a Strange Land*.

ENG 4211 Fantasy Literature (3 q.h.)
Exploration of fantasy literature of the nineteenth and twentieth centuries and its roots in myth, fairy-tales, and popular legends. Focuses on the works of such authors as T.H. White, Lewis Carroll, Lord Dunsany, Kenneth Grahame, Richard Adams, J.R.R. Tolkien, Ursula Le Guin, and Patricia McKillin.

ENG 4212 Horror Fiction (3 q.h.)
Horror literature and its concerns with the supernatural, the irrational, the nature of evil, and the landscape of dreams, including such novels as *Dracula*, *Dr. Jekyll and Mr. Hyde*, and *The Turn of The Screw*.

ENG 4213 Detective Fiction (3 q.h.)
Elements of intrigue, logic, and thought converge in this study of the whodunit. Students sample a wide range of detective fiction to explore the questions of innocence and guilt, action and responsibility, power and authority, and victim and victimizer, and to see connections between this popular form of literature and its classical antecedents.

ENG 4214 The Psychological Novel (3 q.h.)
A study of the mental and emotional processes affecting the form and style of such works as *Crime and Punishment*, *The Metamorphosis*, and *The Stranger*.

ENG 4220 Children's Literature (3 q.h.)
The psychology of creation, the ways of the imagination, and the role of fantasy and play in such children's books as *Alice in Wonderland*, *The Wizard of Oz*, and *Charlotte's Web*.

ENG 4221 Images of Women In Literature (3 q.h.)

Images of women and their underlying archetypes in imaginative literature. Includes such writers as Homer, Austen, Ibsen, and Lawrence.

ENG 4222 American Women Writers (3 q.h.)

Representative nineteenth- and twentieth-century American women writers, including such poets as Dickinson and Plath and such novelists as Chopin and Cather.

ENG 4223 British Women Writers (3 q.h.)

Important historical and thematic connections in the work of British women writers of the last two hundred years, including the novels of Austen, Eliot, Woolf, and Lessing.

ENG 4230 Modern Irish Literature (3 q.h.)

Irish literature in English from 1885 to the present, including such writers as Yeats, Joyce, O'Casey, and Behan.

ENG 4231 Irish Writers In America (3 q.h.)

Irish themes and attitudes in the fiction and drama of twentieth-century America, including such writers as O'Neill, Donleavy, Alfred, and McHale.

ENG 4232 Ethnic Literature In America (3 q.h.)

The range, variety, and themes of ethnic literature in America in the work of such writers as Philip Roth, Toni Morrison, Maxine Hong Kingston, and F. Scott Momaday.

ENG 4235 The American Dream (3 q.h.)

Is the American Dream true or a myth? The study of literature about money: stories of wealth and poverty, success and failure. Students will read such books as Franklin's *Autobiography*, Wharton's *House of Mirth*, and Sinclair's *The Jungle*.

ENG 4240 Fiction and the Movies (3 q.h.)

Reading and seeing: an examination of the success (and failure) of turning famous novels and stories into movies. Analysis of book-film case studies such as *The Postman Always Rings Twice*, *A Room with a View*, *Sophie's Choice*, *The Unbearable Lightness of Being*, *Hannah and Her Sisters*, and *The Last Picture Show*. Includes elementary film theory and criticism. (Laboratory fee.)

ENG 4241 Topics In Film (3 q.h.)

Explores a chosen theme in literature and in film, drawing upon important cultural, po-

litical, or psychological issues of our time. Focuses on a different topic each quarter, using films inspired by both classic and contemporary novels, stories, and plays—for example, *Literary Heroines Go Hollywood*, *Paranoia: From Hitchcock to Oliver Stone*, *Films from Shakespeare*—so that students may take this course more than once. (Laboratory fee.)

ENG 4242 Screenwriting (3 q.h.)

An introduction to the craft of constructing a feature-length shooting script for film or television. Emphasis is on the close defining of plot ideas and the "sound" of the characters, on the structuring of effective short scenes and longer sequences, and on learning some of the cinematic techniques and trade secrets peculiar to the art of film writing. Video clips will be analyzed throughout the course.

ENG 4243 Screenwriting Workshop (3 q.h.)

An advanced course, intended primarily for students wishing to complete or polish scripts begun in ENG 4242. May also be taken by anyone who already knows the fundamentals of the screenwriting format and now wishes to begin a new project or finish one started elsewhere. *Prereq.* ENG 4242 or instructor's permission.

ENG 4260 The Literature of Adolescence (3 q.h.)

Adolescence as depicted in works drawn from different cultures and times. Examines popular versus literary views of adolescence, focusing on such themes as the struggle for self-definition, the role of peers, and the effects of gender and class.

ENG 4261 The Literature of Old Age (3 q.h.)

Old age as depicted in works drawn from different cultures and times. Examines popular versus literary views of old age, focusing on such themes as old age as a period of psychological reassessment; the role of family, class, and gender; and the emotional implications of confronting death.

ENG 4349 Expository and Persuasive Writing 1 (3 q.h.)

Designed to help students develop confidence and proficiency in writing. Through first drafts to revisions, weekly writing assignments concentrate on mastering the skills of subject focus, clarity of expression, controlled development, and organization. *Prereq.* ENG 4110 or equiv.

ENG 4350 Expository and Persuasive Writing 2 (3 q.h.)

Development of precise and persuasive writing patterns through experiments with various rhetorical strategies. Students are expected to write extensively on topics of current interest to gain fluency and to learn how to target their writing toward different audiences. Assignments also provide practice in persuasive writing and in using different writing models to gain control of the material. *Prereq.* ENG 4349 or equiv.

ENG 4352 Expository Communications (3 q.h.)

Workshop in expository prose, emphasizing the practical problems of the writer on the job in advertising, public relations, or publishing. Includes practice in designing and writing special projects. *Prereq.* ENG 4350 or equiv.

ENG 4356 Creative Writing (3 q.h.)

An opportunity to write and develop a variety of forms, including experiments in journals and short stories, plays and poems. Features in-class discussion of students' work and a final project of choice.

ENG 4357 Creative Writing: Poetry (3 q.h.)

Practice in writing different forms of poetry for beginning poets. Includes discussion and criticism of student work and selected texts.

ENG 4358 Creative Writing: Fiction (3 q.h.)

Practice in writing various types of short stories for beginning writers of short fiction. Includes discussion and criticism of student work and selected texts.

ENG 4359 Creative Writing Workshop (3 q.h.)

Discussion and criticism of student manuscripts for practicing writers.

ENG 4363 Writing for the Marketplace (3 q.h.)

Workshop for writers venturing into the marketplace. Provides a working knowledge of the publishing industry and useful practice in preparing and editing manuscripts for publication. Includes the development of effective strategies for composing query letters, synopses, outlines, and sample manuscripts.

ENG 4370 Developmental Editing 1 (formerly ART 4602) (3 q.h.)

For individuals with some editorial experience who wish to develop their skills. Focuses on bringing a manuscript to comple-

tion by rewriting and reorganizing material with author's cooperation. Includes lectures, discussion, guest speakers from publishing houses, and a variety of writing/editing assignments in fiction and nonfiction.

ENG 4372 Manuscript Editing (formerly ART 4604) (3 q.h.)

For novices who wish to break into the field or those who edit on the job. Numerous written exercises give students practice in handling common problems in editing book and magazine manuscripts. Includes practice in spelling, grammar, syntax, and style.

ENG 4380 Business Writing and Reports 1 (3 q.h.)

Introduction to the vocabulary and philosophy of business communications. Practice in planning, writing, and analyzing effective business letters and memoranda. *A writing proficiency test is given at the first class meeting.*

ENG 4381 Business Writing and Reports 2 (3 q.h.)

Methods and principles of research and documentation of semitechnical analyses and business reports. Practice in organizing and writing complex forms of business communications. *Prereq.* ENG 4380 or equiv. *No prereq. for Liberal Studies or Technical Communications degree candidates.*

ENG 4383 Business Writing and Reports (Intensive) (6 q.h.)

Same as ENG 4380 and ENG 4381. *A writing proficiency test is given at the first class meeting.*

ENG 4384 Advanced Business Writing (3 q.h.)

Students develop analytical and problem-solving abilities through study of Harvard Business School cases aimed at developing students' analytical and problem-solving abilities. Through carefully directed classroom discussions of administrative problems presented in case studies, students consider case facts, assumptions, and opinions to reach a solution to a manager's problem, and have the opportunity to develop the oral and written communication skills to set their solutions in motion. *Prereq.* ENG 4381.

ENG 4500 The English Language (3 q.h.)

Development of modern English from its pre-Anglo-Saxon beginnings. Effects of Roman, Scandinavian, and Norman invasions; dialect geography; evolutionary change; and word formation and borrowing.

ENG 4501 Linguistics (3 q.h.)

Introduces students to a new way of thinking about language. Normally, using language is as unconscious an activity as walking or chewing gum. But if we ask the right questions, we can uncover much of our unconscious linguistic knowledge: about sentence structure (syntax), meaning (semantics), word forms (morphology), and speech sounds (phonology).

ENG 4502 Semantics (3 q.h.)

Focuses on meaning and how it is expressed in language—through words, sentence structure, intonation, stress patterns, and speech acts. How do content, logic, and speakers' and listeners' assumptions affect what sentences can mean? In what ways is linguistic meaning determined by our perceptual system or our culture?

ENG 4600 Topics in Literature (3 q.h.)

Examination of a variety of subjects and themes, such as the relationship between literature and the arts, the censored novel, alienation, and the Holocaust. Because the topics change from quarter to quarter, students may take this course more than once, provided they focus on a different topic each time.

ENG 4604 Major Figure in Literature (3 q.h.)

Examines in detail and depth the work of a major writer of poetry, fiction, or drama, such as Whitman, Tolstoy, Woolf, or Beckett. Students may take this course more than once, provided they focus on a different figure each time.

ENG 4610 The American Short Story (3 q.h.)

Development of the American short story from its nineteenth-century origins to its present forms. Includes such writers as Poe, Hawthorne, James, Hemingway, Roth, and Updike.

ENG 4611 The American Novel (3 q.h.)

Development of the novel in America and its characteristic qualities. Includes such writers as Cooper, Melville, James, Wharton, Faulkner, and Ellison.

ENG 4640 Twentieth Century English Literature (formerly The Twentieth Century) (3 q.h.)

An examination of some of the major writers in England and the movements, such as Realism or Post Modernism, that marked their

fiction and poetry. Authors studied may include William Butler Yeats, James Joyce, Virginia Woolf, Dylan Thomas, Muriel Spark, Anthony Burgess, and Iris Murdoch.

ENG 4641 Twentieth Century American Literature (3 q.h.)

An examination of some of the major American writers of the twentieth century and the movements and themes that marked their fiction and poetry. Authors to be studied may include Ezra Pound, T.S. Eliot, Robert Frost, William Carlos Williams, F. Scott Fitzgerald, Ernest Hemingway, Flannery O'Connor, Allen Ginsberg, and Alice Walker.

ENG 4642 The English Novel (3 q.h.)

Development of the English novel from its beginnings in the eighteenth century through its concern with manners and morals in the nineteenth century to the experimentation of the twentieth century. Includes such writers as Fielding, Richardson, Austen, Dickens, Eliot, and Woolf.

ENG 4649 European and English Short Story (3 q.h.)

Development of the short story in Europe and England in both the nineteenth and twentieth centuries. Includes such writers as de Maupassant, Balzac, Mann, Camus, Kipling, Lawrence, Greene, and Böll.

ENG 4650 Modern Bestsellers (3 q.h.)

The fascinating world of modern bestsellers, a world of romance and adventure, of high living and sinister intrigue, by such popular writers as Rona Jaffe, Harold Robbins, Jacqueline Susann, and Irving Wallace.

ENG 4651 The Continental Novel (3 q.h.)

Development of the European novel through its various forms and themes, from Balzac and Tolstoy to Proust and Mann.

ENG 4652 Russian Masterworks (3 q.h.)

The work of such Russian masters of the novel and the short story as Pushkin, Turgenev, Dostoyevsky, and Tolstoy in the nineteenth century and Zamyatin, Pasternak, Babel, and Solzhenitsyn in the twentieth.

ENG 4653 Latin American Fiction (3 q.h.)

The variety of Latin American fiction of the past generation of writers, such as Marquez and Puig, Borges and Cortazar, Bombal and Lispector.

ENG 4655 Contemporary Fiction (3 q.h.)
An examination of some of the most influential fiction of the last quarter century. Authors will vary, and students may expect to study writing by both established and emerging writers. Authors such as Alice Walker, Russell Banks, Jay McInerney, Toni Morrison, and Milan Kundera will be studied.

ENG 4658 Shakespeare the Dramatist (3 q.h.)
Detailed examination of representative plays from Shakespeare's early, middle, and late periods in order to illustrate his development as a dramatist and define his principal themes in such plays as *A Midsummer Night's Dream*, *Romeo and Juliet*, and *King Lear*.

ENG 4659 Shakespeare: The Major Tragedies and Comedies (3 q.h.)
Study of examples of Shakespeare's mature dramatic art, such as *As You Like It*, *Much Ado About Nothing*, *Hamlet*, *Macbeth*, and *Antony and Cleopatra*.

ENG 4660 Shakespeare on Film (3 q.h.)
A survey of the variety of ways Shakespeare has been adapted to the screen, featuring classic versions of the great tragedies by Orson Welles, Laurence Olivier, and Roman Polanski, as well as Kenneth Branagh's *Henry V* and Burton and Taylor in *The Taming of the Shrew*.

ENG 4662 The Bible as Literature (3 q.h.)
Studies selected books of both the Old Testament and New Testament as literature in an historical and cultural context.

ENG 4802 Honors Program 1 (4 q.h.)
Opportunity to undertake an in-depth research study project. See page 24 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

ENG 4803 Honors Program 2 (4 q.h.)
See ENG 4802.

ENG 4804 Honors Program 3 (4 q.h.)
See ENG 4802.

ENG 4815 Advanced Tutorial 1 (3 q.h.)
Opportunity to take an upper-level course independently. See page 23 for details. *Prereq.* 87 q.h.

ENG 4816 Advanced Tutorial 2 (3 q.h.)
See ENG 4815.

ENG 4820 Independent Study 1 (3 q.h.)
Opportunity to undertake special research. See page 24 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

ENG 4821 Independent Study 2 (3 q.h.)
See ENG 4820.

ENG 4822 Independent Study 3 (3 q.h.)
See ENG 4820.

ENG 4823 Field Work in Business Writing (6 q.h.)
Allows students to earn credit for the application of their academic background in business writing to practical problems in the work place. *Prereq.* ENG 4380 and ENG 4381 and Program Office approval.

EARTH SCIENCES

ESC 4103 Introduction to the Earth Sciences: The Solid Earth (3 q.h.)
A general introduction to the processes that affect the earth's surface and interior: the effects of rivers and glaciers on the earth's surface; the influence of wind, waves, currents and storms on coasts; plate tectonics and the origin of volcanoes, mountain belts, and earthquakes.

ESC 4104 Introduction to the Earth Sciences: Earth's Oceans and Atmosphere (3 q.h.)
This course is a general introduction to the earth's oceans and atmosphere. The course explores how the sea is affected by: the rotation of the earth; by sunlight; by the gravity of the moon and sun; by glaciers and rivers; and by the surrounding continents. The earth's weather systems are influenced by many of the same factors, and the course uses this background to explain the broad patterns of winds and storms on our planet.

ESC 4105 Introduction to the Earth Sciences: Earth and the Planets (3 q.h.)
This course considers current ideas on the development of the solar system. It describes how the earth and moon evolved as planetary bodies, and contrasts their development with that of the other planets and moons in terms of size, distance from the sun, and bulk composition. Many observations are used to describe current thoughts about how the solar system has developed, including: telescope studies of the sun, moon and planets; studies of rock samples returned from the moon and of meteorites found on the earth; and data obtained by planetary lander and fly-by missions.

ESC 4107 Solid Earth, Oceans and Atmosphere (6 q.h.)
Same as ESC 4103 and ESC 4104.

ESC 4109 Introduction to the Earth Sciences (Intensive) (9 q.h.)
Same as ESC 4103, ESC 4104, and ESC 4105.

ESC 4111 Geology of the Boston Area (3 q.h.)
Designed to give students without prior field experience a working knowledge of the bed-rock and glacial development of the Boston metropolitan area. There will be six regular class meetings of standard length and two all-day Saturday field trips.

ESC 4203 Gemology (3 q.h.)
Topics include aspects of crystallography and physical properties of minerals relevant to gemstones; gem cutting methods; origin of color in minerals; behavior of light in minerals and its influence on gem cutting; types of inclusions found in gemstones and their effects on optical properties (star sapphire, cat's eye); techniques of growing crystals; geology and geography of selected gem deposits; properties of the major types of gemstones and imitations.

ESC 4204 Physical Geology (3 q.h.)
This course covers the same range of material as ESC 4103, but in more detail and at a faster pace. The course focuses on a discussion of the plate tectonic processes believed to underlie the evolution of the continents, oceanic islands, and the ocean basins, in order to explain the generation of earthquakes, volcanoes and mountain belts. One effect of moving continents and ocean basins sideways is to create high mountain ranges. Once the rock has been uplifted by plate tectonic events, the course examines the weathering and erosional processes which wear the mountains down.

ESC 4210 Physical Oceanography (3 q.h.)
Origin of the global ocean, the physical and chemical properties of sea water, the development of ocean currents and their effects on land masses of the world, and the problems of ocean pollution.

ESC 4211 Biological Oceanography (3 q.h.)
Study of habitat zones and organisms of the sea and the economic importance of renewable marine resources for an expanding world population.

ESC 4212 Geological Oceanography (3 q.h.)
This course examines the geology of the sea floor. Continental shelves, abyssal plains, volcanic ocean ridges, and deep-sea trenches are explained using the plate tectonics model of the earth. Observations from submersibles, rock and sediment samples from the sea floor, and geophysical methods are used to explain the processes that form the mountains and valleys and the rock types that characterize the sea floor.

ESC 4213 Marine Resources (3 q.h.)
This course considers the ways in which the sea is used as a source of food, energy, transportation, and recreation. The importance of mariculture, conservation, and effects of pollution on fish and shellfish stocks are discussed. Energy sources derived from the sea include tidal power, temperature differences between warm surface water and cold deep water, and offshore deposits of gas and oil. The course concludes with a discussion of the conflicts inherent in the diverse ways in which the seas are used for recreation, transportation, fishing, and the extraction of energy resources.

ESC 4218 Groundwater (3 q.h.)
The course discusses the geologic nature of different types of aquifers in New England and other parts of the world, and examines the principles of groundwater flow in permeable rock and soil. *Prereq. Calculus course or permission of the instructor.*

ESC 4219 Geochemistry of Groundwater (3 q.h.)
The course describes how the composition of uncontaminated groundwater is affected by the chemistry of precipitation and by reactions with the organic and inorganic components of soil and rock. The course next considers the geochemical aspects of a number of specific groundwater contamination problems including: leachate plumes from landfills; improper disposal of hazardous wastes, leaking underground storage tanks; saltwater intrusion of coastal aquifers; etc. *Students should have taken at least one chemistry course.*

ESC 4220 Wetlands (3 q.h.)
The course explores the hydrology and biogeochemistry of wetlands, describes the attributes of specific wetlands types, and examines current wetland protection and management strategies.

ESC 4221 Environmental Geophysics (3 q.h.)
Intended for both students and practicing professionals, this course will show how geophysical techniques can help solve a wide range of environmental and engineering problems. After a brief historical survey, the most commonly used methods are considered in detail, including: seismic, gravity, magnetics, resistivity, electromagnetics, ground penetrating radar, and borehole methods. Emphasis on practical applications, and numerous case studies will be used as examples. Students will have the opportunity to design and plan geophysical studies based on actual and theoretical situations.

ESC 4233 The Earth's Atmosphere (3 q.h.)
An introduction to the science of meteorology, in more detail than the treatment in ESC 4104. This course describes how the sun's heat, the earth's gravity, and the earth's rotation combine to cause the large-scale patterns of winds on our planet. After describing why winds generally move east-to-west in some latitudes and west-to-east in others, the formation and motion of smaller air masses and weather fronts is considered, a topic continued in greater depth in ESC 4234.

ESC 4234 Storms (3 q.h.)
This course is focused on understanding how different types of storms develop and why they occur when and where they do. Topics include: thunderstorms, tornadoes; formation of rain, hail, and snow; wind; lightning; hurricanes and cyclones. *Prereq.* ESC 4233 recommended.

ESC 4235 Weather Forecasting and Climate Change (3 q.h.)
This course begins by discussing the kinds of data that meteorologists use to make short-term weather forecasts; how the data are obtained and summarized on weather maps; and how the maps and computers assist in forecasting the weather. The second part of the course steps backward in time to examine the causes of the earth's long-term climate fluctuations, on a scale of tens of thousands of years, using the Milankovic hypothesis (changes in the earth's orbit, etc.). Implications of the Milankovic model, plus possible warming due to the Greenhouse Effect, are used to discuss possible future changes in the earth's climate. (*ESC 4233 useful but not required.*)

ESC 4239 Observational Astronomy (3 q.h.)
Introduction to the planets, stars, and constellations visible to the naked eye through lectures and outside viewing sessions. Emphasizes stars and constellations easily seen from mid-northern latitudes.

ESC 4243 Stars (3 q.h.)
This course traces the events that occur throughout the lifetimes of different kinds of stars. Topics include: the sun as a model star; the differences that are observed in mass, temperature, and types of energy emitted among different types of stars; formation of stars; creation of chemical elements within stars and dispersal of these elements into surrounding space during super-novas; and processes that stars undergo in their juvenile stage, through middle age, to death. *Prereq.* ESC 4239 recommended.

ESC 4244 Cosmology (3 q.h.)
Cosmology is the study of the universe as a whole. This course expands upon topics introduced in ESC 4243. Topics discussed in this course include: the structure of galaxies (Milky Way, Andromeda, etc.); the nature of interstellar and intergalactic space; and quasars, pulsars, and black holes. The major focus of this course is to enable students to appreciate the data and arguments involved in choosing between different explanations that have been proposed for the behavior of the universe. *Prereq.* ESC 4243 recommended.

ESC 4250 Conservation and the Nation (3 q.h.)
This course provides an overview of the ways in which people interact with the environment. Topics covered include: air and water pollution; waste disposal; farming and soil conservation; and general principles of ecology, emphasizing human impact on the environment and how it has changed in North America over the past few hundred years.

ESC 4251 Conservation and the Community (3 q.h.)
Study of conservation problems and land-use practices at the local level. Includes an in-depth study of urban development and its impact on the environment. *Prereq.* ESC 4250 recommended.

ESC 4252 Conservation Management (3 q.h.)
This course reviews the structure of local governments and the role played by govern-

ment in regulating people's impact on the environment. Topics include: land use planning and zoning; conservation commissions; wetlands protection; groundwater and drinking water protection; solid waste and hazardous waste management; and sources of information or assistance for community efforts. *Prereq.* ESC 4251 is recommended.

ESC 4260 Seminar in Geological Hazards (3 q.h.)

A wide variety of natural phenomena (floods, earthquakes, hurricanes, volcanic eruptions, desertification, etc.) can have severe effects on people, on society (communications, agriculture, transportation systems, etc.) and on the environment. This course will investigate the geologic causes of 2 or 3 of these environmental hazards, depending on student interests. It will introduce students to the concepts of risk assessment, and to the ways in which societies can act to minimize the risks and to recover from the events when they occur.

ESC 4430 Soils and the Environment (3 q.h.)

An introduction to the origin, characteristics, and classification of soils, emphasizing important types found in southern New England. The course provides an overview of important physical, chemical and biological processes which affect the development of soils, and discusses the role played by grain size, mineral type, and organic content of soils in controlling the migration of contaminants through the soil horizon.

ESC 4435 Air Quality (3 q.h.)

While modern societies contribute much pollution to the atmosphere, natural processes can also adversely affect air quality. This course discusses the wide range of impacts which can affect air quality including: particulates such as asbestos or lead-rich dust, volcanic ash, or ash from forest fires and power generation; biological inputs such as pollen and methane from landfills or cattle feedlots; and gaseous chemical pollutants such as radon and volatile organic compounds. It provides an overview of current air-quality legal standards, and methods of monitoring air quality.

ESC 4440 Geology and Urban Planning (3 q.h.)

This course focuses on the geologic limitations on urban development. It outlines methods of incorporating geologic informa-

tion into land-use zoning and development regulations for coastal and hillslope areas, and for groundwater protection. Class exercises based on real situations and localities help to illustrate how inappropriate land uses can occur if local geologic constraints are ignored.

ESC 4450 Introduction to Hydrology (3 q.h.)

This course describes the processes which affect the movement and composition of water at and near the earth's surface, including rain and atmospheric chemistry; groundwater; rivers; lakes; estuaries; and the sea. Also discussed are the global cycles of nutrients (nitrogen, phosphorus); physical processes which control the seasonal vertical mixing of lakes; and an introduction to the use of box models to estimate the buildup or removal of pollutants in bodies of water.

ESC 4680 Science, Technology, and Ancient Societies (3 q.h.)

Interdisciplinary course conducted using an independent study/seminar approach. An examination of changes in sciences, technologies, and societal structures from prehistory through classical cultures and the beginning of the Renaissance.

ESC 4681 Science, Technology, and Modern Societies (3 q.h.)

Interdisciplinary course conducted using an independent study/seminar approach. An examination of changes in sciences, technologies, and societal structures from the beginning of the Renaissance through the period of industrialization and the present day.

ESC 4682 Science, Technology, and Society (Intensive) (6 q.h.)

Same as ESC 4680 and ESC 4681.

ESC 4700 Advanced Tutorial 1 (3 q.h.)

Opportunity to take upper-level course independently. See page 23 for details. *Prereq.* 87 q.h.

ESC 4701 Advanced Tutorial 2 (3 q.h.)

See ESC 4700.

ESC 4801 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 24 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

FINANCE

FI 4101 Personal Finance (3 q.h.)

A practical approach to problems involved in managing personal finances. Includes financial planning, budgeting, obtaining credit and loans, income taxes, savings and investments, life insurance, home buying, and estate planning. Subjects are treated in a nontechnical manner. Recommended for nonfinance majors.

FI 4301 Principles of Finance (3 q.h.)

The scope and nature of finance, introducing basic financial concepts and principles. Includes financial analysis, financial planning, working capital management, the time value of money, and an introduction to financial markets and different types of securities. *Prereq.* ACC 4102 and ECN 4116.

FI 4302 Financial Management (3 q.h.)

Introduction to financial management from both domestic and international perspectives. Includes valuation, leverage, financial analysis and planning, working capital management, capital budgeting, cost of capital, and long-term and short-term financing decisions. Spreadsheets used. *Prereq.* MIS 4101 and FI 4301. *Please bring a calculator to class.*

FI 4306 Personal Financial Planning (3 q.h.)

Insurance planning is an important part of financial planning. Class focus is on the informed decisions necessary to establish a comprehensive, rational plan of personal insurance. Class discussion, lectures, and readings examine the various kinds of personal insurance and how to create an insurance package for different insurance needs.

FI 4310 Investment Principles (3 q.h.)

Investment concepts, practices, and procedures. Reviews various types of investments, including the role of security markets and security analysis. *Prereq.* FI 4301.

FI 4320 Credit Principles (3 q.h.)

Introduction to credit and its functions. Examines the role of the credit executive, credit investigation, documentary credit, trade credit, and organization of the credit department. *Prereq.* FI 4301.

FI 4325 Budgeting and Planning (3 q.h.)

Managerial planning, budgetary control, and financial analysis. Studies the interrelation between functional areas in an organization using consolidated profit planning as an in-

tegrating device. Covers fundamental financial analysis, comprehensive profit planning, general expense planning, production planning, materials planning, purchasing. *Prereq.* FI 4301.

FI 4329 Quality Financial Management (3 q.h.)

Total Quality Management as it relates to the finance function in organizations is the topic of this course. Financial managers are key players applying the principles of TQM in organizations. These principles include being customer driven, empowering teams, continuously improving processes and services, and monitoring and evaluating quality in an information systems context. The course not only investigates quality management within the finance function, but it addresses the role of finance in an integrated approach to business problem solving in a global context. It then traces the effect of quality management through the overall planning and budgeting process to the key risk and return indicators of financial performance and the creation of shareholder wealth. *Prereq.* FI 4302, FI 4325, and FI 4310.

FI 4332 Management of Banks and Financial Institutions (3 q.h.)

Financial management and operation of bank and nonbank financial institutions and their role in the economy. Discusses objectives, services, asset management, liquidity, pricing, capital adequacy, and sources of financing and profitability in a changing economic and regulatory environment. Lectures, discussions, and case studies. *Prereq.* FI 4302. *Not open to students who have taken FI 4330 or FI 4335.*

FI 4336 Risk Management and Insurance (3 q.h.)

Emphasizes the functional area of corporate risk management. Covers such topics as organizing and controlling the risk management function; identifying, measuring, controlling, and financing risk; selecting the best method of risk treatment; and implementing and monitoring risk management. Topics of exposure analysis include property, liability (public, employer, products, officers and directors, and professionals), income, and extraordinary expense losses. Covers treatment methods such as self-insurance and commercial insurance. Includes recent developments such as tort reform, integration of risk management with managerial finance

with special emphasis on pensions, profit sharing plans, and international considerations. *Prereq.* FI 4302 or FI 4402.

FI 4360 Speculative Markets (3 q.h.)

Studies futures contracts and options contracts, their rapid growth in speculative markets, and the uses of these contracts. Both individual investors and institutional investors such as portfolio managers, banks, multinational corporations, and mutual funds can now minimize their exposure to movements in stock prices, exchange rates, and interest rates by following active and dynamic portfolio strategies that employ these new instruments. *Prereq.* FI 4411 or instructor's permission.

FI 4383 Personal Financial Planning (3 q.h.)

Development of financial planning expertise useful to those considering careers as personal financial planners. Includes budgeting, insurance, taxes, estate planning, basic investment vehicles and strategies, and related legal aspects. *Prereq.* FI 4301 or FI 4401.

**FI 4403 Financial Strategy (Reserved)
(3 q.h.)**

Financial management using the case-method approach. Includes advanced capital budgeting, capital structure. Decision-making, dividend policy, leasing, convertibles and warrants, mergers, failures and reorganization, and the timing of financial policy. *Prereq.* FI 4402 or FI 4302 and 80 q.h.

**FI 4411 Investment Management (Reserved)
(3 q.h.)**

Relationship between the economy and stock prices. Covers corporate analysis, earnings, dividends, and cash flow and introduces portfolio analysis. Studies technical analysis versus fundamental factors. *Prereq.* FI 4410 or FI 4310 and 80 q.h.

**FI 4421 Credit Management (Reserved)
(3 q.h.)**

Forms of credit and collection services, including analysis of financial statements, determination of credit-worthiness, creditors' rights, adjustment bureau operations, credit insurance, and guarantees. *Prereq.* FI 4420 or FI 4320 and 80 q.h.

FI 4426 Financial Control (Reserved) (3 q.h.)

Development and application of variable budgets, planning and control of capital expenditures, computer applications in profit planning, cash flow planning and control,

cost-profit-volume analysis, performance reporting, and analysis of budget variations. *Prereq.* FI 4425 or FI 4325 and 80 q.h.

**FI 4450 International Finance (Reserved)
(3 q.h.)**

Introduction to international financial management in the multinational corporation. Analyzes basic problems and finance considerations involved with international investments, trade, and payments. Also covers planning in the international environment related to exchange rates, financial strategy, sources of capital, working capital management, fund flows, and management control through accounting and financial reporting. *Prereq.* FI 4302 and 80 q.h.

FI 4600 Honors Program 1 (4 q.h.)

Opportunity to undertake an in-depth research study project. See page 24 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

FI 4601 Honors Program 2 (4 q.h.)
See FI 4600.

FI 4602 Honors Program 3 (4 q.h.)
See FI 4600.

FI 4701 Independent Study 1 (3 q.h.)
Opportunity to undertake special research. See page 24 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

FI 4702 Independent Study 2 (3 q.h.)
See FI 4701.

FI 4703 Independent Study 3 (3 q.h.)
See FI 4701.

FI 4800 Advanced Tutorial 1 (3 q.h.)
Opportunity to take upper-level course independently. See page 23 for details. *Prereq.* 87 q.h.

FI 4801 Advanced Tutorial 2 (3 q.h.)
See FI 4800.

HEALTH INFORMATION ADMINISTRATION

Currently enrolled students should plan their course of study with the program director to avoid duplication of courses.

HIA 4300 Medical Terminology (4 q.h.)
Analysis and definition of medical terms. Study of anatomical, diagnostic, operative symptomatic and pathological terms relating to all body systems. *Prereq.* BIO 4175, BIO 4176, BIO 4177 or equiv.

HIA 4315 Health Information Administration 1 (3 q.h.)

Introduction to health information systems covering health information history, numbering, filing, security and the health information specialist's relationship to the health facility. Stresses quantitative and qualitative analysis of the health record with emphasis placed on licensing and accrediting standards for health records. *Prereq.* BIO 4175, BIO 4176, BIO 4177 or *equiv.* and HIA 4300.

HIA 4316 Health Information Administration 2 (3 q.h.)

Study of the preservation and retention of health records, the legal aspects of health information, the study of the basic principles of abstracting and compiling statistics for health care facilities, and the preparation of statistical reports and vital registration. *Prereq.* HIA 4315.

HIA 4328 Nomenclature and Classification 1 (3 q.h.)

Designed to develop basic student competencies in the use of ICD-9-CM coding system, introduce the major coding systems used today in health care delivery systems, identify issues related to coding and data quality and the uses of coding for index development. *Prereq.* BIO 4175, BIO 4176, BIO 4177 or *equiv.*, HIA 4300, HIA 4315 or *instructor's permission.*

HIA 4329 Nomenclature and Classification 2 (3 q.h.)

Designed to develop advanced student competencies in the use of ICD-9-CM coding system. Continuation of HIA 4328. *Prereq.* HIA 4328.

HIA 4335 Clinical Practicum 1 (3 q.h.)

First of three clinical practice affiliations will emphasize the technical aspects of health information administration. This clinical will include admitting procedures, health record analysis and retention, release of information, coding and indexing. *Prereq.* HIA 4316 and HIA 4329.

HIA 4336 Clinical Practicum 2 (2 q.h.)

The second of three clinical practice affiliations is designed to introduce students to non-traditional health information systems. Students affiliate at long term care facilities, community health centers, HMO's, mental health facilities, VNA's, etc. The health information needs of these facilities are em-

phasized. Students are also introduced to the role of the health information consultant within non acute care settings. *Prereq.* HIA 4400 and HIA 4335.

HIA 4337 Clinical Practicum 3 (3 q.h.)

The final clinical affiliation emphasizes the organizational and managerial aspects of health information systems. Students are required to do special management projects under the direction of the clinical preceptor. Experience in Quality Assurance programs within hospitals and health care settings is also gained. *Prereq.* HIA 4431, HIA 4410 and HIA 4336.

HIA 4400 Specialized Health Information Systems (3 q.h.)

Study of non-traditional aspects of health information administration. Special focus is on the management of health information systems in ambulatory, long term care, home care and psychiatric settings. Tumor registry is also studied. *Prereq.* HIA 4316 and HIA 4329.

HIA 4410 Quality Assurance (4 q.h.)

Introduction to utilization review, PRO requirements, quality assurance and risk management in health facilities with emphasis on methodology for development of criteria and tool development and the performance of monitoring and evaluation of patient care, physician and provider performance. Evaluation on monitoring as current method of cost and quality control will also be addressed. *Prereq.* HIA 4400 or *permission of instructor.*

HIA 4430 Health Information Management 1 (3 q.h.)

Focus is on the organization and management of a Health Information Department within the health care setting. Stresses management principles and practices utilized in health information systems. Management skills necessary to develop organization charts, policies, job descriptions and job procedures are reviewed. The course is designed to develop the student's ability to plan, organize, actuate and control through the principles of management and the practice of health information administration. *Prereq.* HMG 4100, HIA 4329 and HIA 4400.

HIA 4431 Health Information Management 2 (3 q.h.)

Focus is on the management of Health Information Department within the health care setting. Emphasis is placed upon productivity within the hospital and the Health Information Department. Hospital and departmental budgeting, cost control mechanisms, forms design and office layout will also be reviewed. Review of contracting will also be studied. This course is a continuation of HIA 4430. *Prereq.* HIA 4430.

HIA 4500 Health Information Computer Systems (3 q.h.)

Introduction and management of computer applications within the Health Information Department and health care environment with emphasis on health information systems relating to health records. Review and assessment of state-of-the-art information systems and the future of such systems in health information administration is studied. *Prereq.* COM 4101 and HIA 4400.

HIA 4520 Topics in Health Information Administration (3 q.h.)

Designed to include an extension and expansion of new or updated issues in Health Information Administration. Current issues will be introduced in a seminar fashion focusing on training and development, resume writing and interviewing techniques, stress management, classification and coding, data quality, health care finance and computer trends and application. *Prereq.* HIA 4410, HIA 4500, HIA 4531.

HIA 4521 Seminar in Health Information (3 q.h.)

This course is designed to allow students to reflect on the elements of personal and interpersonal change as these elements apply to supervisory and managerial responsibilities within the health information administration profession. Students will study problem definition, problem solving and various methods of instituting creative change. *Prereq.* HIA 4431 or HMG 4411.

HIA 4700 Advanced Tutorial 1 (3 q.h.)

Opportunity to take upper-level course independently. See page 23 for details. *Prereq.* 87 q.h.

HIA 4701 Advanced Tutorial 2 (3 q.h.)

See HIA 4700.

HIA 4800 Independent Study (3 q.h.)

Each student will work with the Health Information Administration Program Director to select a topic and/or project to be extensively reviewed and studied. This independent study project is designed to give students the opportunity to explore in-depth a subject relevant to their interests. It is designed to give them the opportunity to study a problem, present a proposal, carry out a course of action and to prepare both a written and oral presentation of their activity. Students are required to present their research to HIA faculty and fellow students using professional audiovisual aids. *Prereq.* HMG 4411 and HIA 4431.

HEALTH MANAGEMENT

HMG 4100 Hospital Organization and Management 1 (3 q.h.) *

Study of hospital organizational structure and administration. Focuses on the complex nature of health administration, its interdependent relationships and organizational strategy. *Prereq.* HMG 4301 or permission of the instructor.

HMG 4101 Hospital Organization and Management 2 (3 q.h.) *

Continuation of HMG 4100, emphasizing organizational issues and management techniques. *Prereq.* HMG 4100.

HMG 4103 Hospital Organization and Management (Intensive) (6 q.h.) *

Same as HMG 4100 and HMG 4101.

HMG 4200 Health Science Statistics (3 q.h.)

Designed to give health practitioners the opportunity to learn to apply basic statistical techniques in the gathering, display, and interpretation of health data. Discusses principles of research design and agencies involved in collecting statistical data. *Prereq.* MTH 4111.

HMG 4210 Medical Care and Current Social Problems 1(3 q.h.)

Presentation of some of the complex dilemmas faced in medical ethics today through lectures, seminars, and case studies. Includes the escalating cost of health care versus the

**It is strongly recommended that this course be taken at the beginning of the student's course of study.*

ability to pay; teenage pregnancy; abortion; genetic counseling and screening; behavior control; substance abuse; and the "right to health care."

HMG 4211 Medical Care and Current Social Problems 2 (3 q.h.)

Introduction to such problem areas as child abuse; suicide; euthanasia; the withholding of treatment; the concept and exercise of informed, voluntary consent; patients' rights; the living will; human experimentation; and the allocation of scarce medical resources; and the role of wellness and physical training. *Prereq.* HMG 4210.

HMG 4215 Health Law (3 q.h.)

Basic hospital legal issues relating to corporate and individual liability. Includes an analysis of consent and competency in health care, emphasizing bioethical questions raised by the removal of life-support systems.

HMG 4260 Senior Seminar in Health Care Management (1 q.h.) Offered Spring Quarter only.

A review of current health care management topics, expanding on topics covered in HMG 4429. *Must be taken concurrently with HMG 4429.*

HMG 4300 Home Health Care (3 q.h.)

Programs and techniques for providing effective community home health care and the impact of these programs on the health care delivery system.

HMG 4301 Health Care Delivery Systems (3 q.h.) *

The structure, function, and organization of health care services.

HMG 4310 Principles and Practices of Community Health 1 (3 q.h.)

Community health care activities. Emphasizes community health promotion and the coordination and integration of medical and self-care activities with the needs, goals, and resources of the community.

HMG 4311 Principles and Practices of Community Health 2 (3 q.h.)

Continuation of HMG 4310. Emphasizes specific community health problems. *Prereq.* HMG 4310.

HMG 4325 Health Planning and Regulation (3 q.h.)

Analysis of past and present interventions that affect the supply and demand side of the

health care system at the community, state, regional, and national levels. Planning and regulations are discussed in the context of political considerations influencing their implementation and effectiveness.

HMG 4390 The Patient's Impact on Decision-Making (3 q.h.)

Explores some of the personal dimensions of illness and treatment and the nature of the relationships between ill people and those trying to care for them. Emphasis on how this interaction effects and influences health management decisions.

HMG 4400 Health Care Financial Management 1 (3 q.h.)

Introduction to health care financial management, including issues in fund accounting, control, and reimbursement. *Prereq.* FI 4301.

HMG 4401 Health Care Financial Management 2 (3 q.h.)

Continuation of HMG 4400. *Prereq.* HMG 4400.

HMG 4411 Research for Managers (3 q.h.)

Provides students with an awareness of the research process and the scientific methods. Types of research design and appropriate approaches to research problems will be covered from both the perspective of a consumer of research data and from that of a person doing research in real world settings. Emphasis will be placed on integrating the research process into the professional decision-making process in the real world. *Prereq.* HMG 4200 or equiv.

HMG 4429 Health Care's Changing Environment (2 q.h.) Offered Spring Quarter only.

Health care delivery systems are experiencing a multitude of changes. Keeping up with the changes and anticipating future changes are the subjects covered in a series of five seminars.

HMG 4440 Health Care Operations Management (3 q.h.)

An applications-oriented case course focusing on selected operations management planning, restructuring, and control problems common to hospitals and other health service organizations. *Prereq.* HMG 4101 and HMG 4301.

**It is strongly recommended that this course be taken at the beginning of the student's course of study.*

HMG 4445 Health Care Marketing and Communication 1 (3 q.h.)

The "how" and "why" of marketing in health care. Presents basic principles, including formulating a marketing plan, strategic marketing practices, and specific marketing for specialized organizations such as HMOs and mental health nursing homes.

HMG 4446 Health Care Marketing and Communication 2 (3 q.h.)

Continuation and expansion of topics covered in HMG 4445. *Prereq.* HMG 4445.

HMG 4550 Contemporary and Controversial Health Care Issues 1 (3 q.h.)

Study of current health care problems. Emphasizes the interrelationships between the economic, social, political, and environmental factors involved in the development and delivery of health care.

HMG 4551 Contemporary and Controversial Health Care Issues 2 (3 q.h.)

Continuation of HMG 4550. *Prereq.* HMG 4550.

HMG 4580 Information Processing in Health Care (3 q.h.)

Introduction to computer applications and management in health care facilities, including the evolution and application of computer use in health, clinical, and business information systems; patient care; management; public health; and reimbursement. The information flow of clinical and nonclinical patient data is applied to the principles of information system life-cycle development. The role of the health manager in selecting, implementing, and evaluating information systems for health care facilities is considered.

HMG 4600 Long-Term Care Administration 1* (6 q.h.)

Organization of care for the long-term and chronically ill patient. Examines the goals, purposes, and design of long-term care facilities as well as budgeting, financing, capital funding, and administration. *Prereq.* HMG 4101.

HMG 4601 Long-Term Care Administration 2* (6 q.h.)

Study of internal and external systems pertinent to the long-term care facility. Examines such topics as the nursing unit, the role of the physician, therapies, licensing agencies, hos-

pitals, and methods for improving services. *Prereq.* HMG 4600 or equiv. or permission of the instructor.

HMG 4602 Long-Term Care Administration 3* (6 q.h.)

Examination of long-term care institutions and their impact on the health care industry. Considers the nature and problems of aging and the care of the elderly in the home, in the community, and in institutions. A general survey and summary of the Massachusetts Nursing Home Administrators Licensure Examination is included. *Prereq.* HMG 4601 or equiv. or permission of the instructor.

HMG 4610 Principles and Practices of Community Mental Health (3 q.h.)

Introduction to the principles of community mental health, emphasizing the development, implementation, operation, delivery, and use of community mental health services.

HMG 4650 Health Management Practicum 1 (6 q.h.)

Working in conjunction with a preceptor, the student performs independent work within an administrative setting. Projects include problem identification, data gathering, analysis of alternatives, and implementation of a plan of action. *Students must have completed 75 percent of the degree requirements before registering for this course. Applications for registering must be submitted two full quarters prior to the desired starting date.*

HMG 4651 Health Management Practicum 2 (6 q.h.)

A continuation of HMG 4650.

HMG 4700 Advanced Tutorial 1 (3 q.h.)

Opportunity to take an upper-level course independently. See page 23 for details. *Prereq.* 87 q.h.

HMG 4701 Advanced Tutorial 2 (3 q.h.)

See HMG 4700.

HMG 4801 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 24 for details.

HMG 4802 Independent Study 2 (3 q.h.)

See HMG 4801.

**Next offered 1994-1995 academic year.*

HUMAN RESOURCES MANAGEMENT

HRM 4301 Organizational Behavior1 (3 q.h.)

This course is designed to provide a fundamental presentation of the dynamics of organizational life. Emphasis is placed on individual and interpersonal behavior in a work setting. Primary focus is on managerial applications of the organizational sciences and included topics such as motivation, communications, and leadership.

HRM 4302 Organizational Behavior2 (3 q.h.)

Expanding on the fundamentals of HRM 4301, this course highlights critical issues associated with a changing domestic and international work force, productivity, and development of effective organizational structures. Other topics include stress, counseling, employee rights, and group dynamics. *Prereq.* HRM 4301.

HRM 4304 Organizational Behavior Intensive 1 and 2 (6 q.h.)

Same as HRM 4301 and HRM 4302.

HRM 4309 Labor Relations (3 q.h.)

An examination of the development, current status and role of organized labor and management structures. The rights and responsibilities of employer organizations, individual employees and their influence on labor relations will be studied. Collective bargaining and grievance procedures will be introduced within the legal framework under which they function. Student participation will be required during case analysis and exercises.

HRM 4310 Human Resource Management (formerly Personnel Management 1) (3 q.h.)

Study of the role of the human resources manager and department. Particular focus on the techniques of employee forecasting, recruitment, compensation and employee relations. Case study and exercises will also deal with critical issues around affirmative action and employee safety.

HRM 4320 Techniques of Employee Selection (3 q.h.)

Fundamental and advanced methods of recruitment, selection and placement techniques are covered. This includes well-known methods such as interviewing and employee testing as well as controversial methods such as handwriting analysis and drug testing.

HRM 4321 Wage and Salary Administration (3 q.h.)

Wage and salary determination, including merit and incentive plans, wage and salary structure, compensation methods, and the impact of employer-employee relations on compensation systems.

HRM 4322 Employee Benefits (3 q.h.)

Study of private and public problems related to job and worker income security. Includes unemployment compensation, training and employment services, private guaranteed income, retirement pension plans, and disability and group insurance.

HRM 4324 Creative Problem Solving (3 q.h.)

Opportunity to learn and practice new ways of thinking. Discusses ways to sense and analyze problems, develop ideas, and evaluate and implement solutions, and examines the attitudes and climates conducive to creative thinking. Also provides methods for developing imagination, the key part of the creative process.

HRM 4325 Training and Development in Organizations (3 q.h.)

Explores the basics of training in a variety of settings in organizations. Special emphasis is placed on training and development as a human resource function by providing an overview of the principles of adult learning, needs assessment, goal setting, and design and evaluation.

HRM 4333 Employment Rights (3 q.h.)

This course examines legal and societal issues surrounding and including discrimination, affirmative action, minimum wage, hours of employment, health and safety, among others. Current rulings and cases will focus students on critical employment rights, challenges facing individuals, businesses and society. *Not open to students who have taken HRM 4330 and HRM 4331.*

HRM 4334 Human Resource Information Systems (3 q.h.)

This course will explain the effective management of computer-based methods in such areas as workforce planning, skills inventory, payroll, and government report generation. Basic techniques of data collection and system design and implementation will be discussed. Students will learn to use information systems to solve human resource problems in a cost-effective manner.

HRM 4342 Strategy Development in HRM (3 q.h.)

In complex organizational forms, managers are now more cognizant of the need for a coherent process of HRM strategy development. In this course, students will analyze the compatibility of individual HRM strategies in such areas as manpower planning, selection and reward systems. Further, HRM policies and strategies will be analyzed in terms of consistency with the organization's strategies for growth/decline, internationalization, and financial and marketing effectiveness.

HRM 4345 Comparative International Labor Relations Systems (3 q.h.)

Comparison and contrast of selected international labor relations systems with that of the United States, including recent developments such as worker participation and co-determination. Research and preparation of position paper by the student; class discussion. *Prereq.* HRM 4302 or HRM 4402.

HRM 4346 Negotiations in Labor Management (3 q.h.)

Negotiation skills, the use of mediation and fact-finding in collective bargaining agreements, the interpretation and application of such agreements, and the use of arbitration. Student participation in simulated negotiation and grievance procedures. *Prereq.* HRM 4302 or HRM 4402.

HRM 4347 Managing People in International Settings (3 q.h.)

This course deals with effective human resource management in international and cross-cultural environments. The student will investigate the selection, orientation and training of personnel for work in multicultural environments. Focusing on the management of the international employee in the United States and abroad, effective cross-cultural communication and behavior will be stressed. *Prereq.* HRM 4302 or HRM 4402.

HRM 4415 Leadership (Reserved) (3 q.h.)

In this course, the leadership function in a variety of organizational settings is studied. Using a contingency approach, students explore a range of possible leadership behaviors, relating the appropriateness of a particular style to a number of situational factors. Readings provide an opportunity to explore several contingency theories of leadership and cases allow for the application of

these models. *Prereq.* HRM 4302, HRM 4402, HRM 4404 or HRM 4304 and 80 q.h.

HRM 4600 Honors Program 1 (4 q.h.)

Opportunity to undertake an in-depth research study project. See page 24 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

HRM 4601 Honors Program 2 (4 q.h.)

See HRM 4600.

HRM 4602 Honors Program 3 (4 q.h.)

See HRM 4600.

HRM 4701 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 24 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

HRM 4702 Independent Study 2 (3 q.h.)

See HRM 4701.

HRM 4703 Independent Study 3 (3 q.h.)

See HRM 4701.

HRM 4800 Advanced Tutorial 1 (3 q.h.)

Opportunity to take upper-level course independently. See page 23 for details. *Prereq.* 87 q.h.

HRM 4801 Advanced Tutorial 2 (3 q.h.)

See HRM 4800.

HEALTH SCIENCE

HSC 4210 Basic Nutrition (3 q.h.)

Introduction to nutrition and foods. Focuses on current scientific knowledge of nutrition and how this knowledge can guide an individual toward making appropriate food choices.

HSC 4220 Basic Pharmacology (3 q.h.)

Introduction to the major classes of drugs. Presents the mode of action, common side effects, dosage, pharmaceutical forms, rate and route of administration, and known interactions and toxicities of the most commonly used drugs. *Prereq.* BIO 4177, CHM 4113, or equiv., or instructor's permission.

HSC 4301 Pathophysiology 1

(formerly Mechanisms of Disease 1) (3 q.h.) The pathophysiology of major diseases. Discusses diagnosis and treatment, emphasizing inflammation, immunology, infectious disease, oncology, endocrine disorders, and trauma. *Prereq.* BIO 4177 or equiv.

HSC 4302 Pathophysiology 2 (formerly Mechanisms of Disease 2) (3 q.h.) Continuation of HSC 4301, using an organ-system approach to disease. Emphasizes cardiovascular, gastro-intestinal, pulmonary, and musculo-skeletal diseases. *Prereq.* HSC 4301.

HSC 4310 Public Health 1 (3 q.h.) Study of principles of public health and current mental and physical health problems. Includes communicable diseases, mental health, maternal and child health, official, voluntary, and international health organizations, and alcoholism. Also examines federal, state, and community resources mobilized to aid in prevention, identification, treatment, and rehabilitation.

HSC 4311 Public Health 2 (3 q.h.) Continuation of HSC 4310. Includes environmental health, chronic diseases, preventive medicine, and public health education.

HSC 4315 Environmental Problems and Health (3 q.h.) Environmental conditions on land and in the air and water, including the causes of pollution, its effects on human and other life, and a general discussion of current control methods. Emphasizes the significance of environmental problems for the individual.

HSC 4320 Training and Development in the Health Professions 1 (3 q.h.) Educational program designed for the practitioner, including program planning, teaching strategies, and the development and evaluation of educational objectives.

HSC 4321 Training and Development in the Health Professions 2 (3 q.h.) Continuation of HSC 4320. Emphasizes program implementation and evaluation and student motivation. *Prereq.* HSC 4320.

HSC 4600 Advanced Nutrition (3 q.h.) Study of food chemistry, nutrition, and physiology as applied to diet. Includes recent developments in normal nutrition and a critical review of the literature and experimental data on which principles of human nutrition are based. *Prereq.* HSC 4210.

HSC 4601 Advanced Pharmacology (3 q.h.) Continuation of HSC 4220. Includes routes of administration of drugs, side effects, variations in potency and efficacy, structure and its relationship to toxicity, allergy, resis-

tance and duration. Also covered: synergism and antagonism. *Prereq.* HSC 4220 or equiv.

HSC 4610 Geriatric Nutrition (3 q.h.) Integration of basic nutrition principles with the most current information on the aging process. Reviews state, local, and federal nutrition programs in terms of services, eligibility, and effect upon the elderly. *Prereq.* knowledge of basic nutrition or instructor's permission.

HSC 5610 Geriatric Nutrition (3 CEUs) Same as HSC 4610.

HSC 4613 Oral Microbiology* (3 q.h.) Study of microbiota inhabiting the ecologic niches of the oral cavity. Examines factors that contribute to the role of bacteria in oral pathology, particularly caries and periodontal disease, and the relationship of bacteria and therapy. *Prereq.* BIO 4190.

HSC 4614 Advanced Periodontology 1* (3 q.h.) Diagnosis, treatment, and control of periodontal diseases, starting with a review of the structure and purposes of the periodontal tissues. Emphasizes the role of the dental hygienist in recognizing and treating disease, motivating and instructing the patient, and carrying out periodontal maintenance therapy. Includes mucogingival problems, furcation involvements, acute gingival infections, root planing, and gingival curettage. *Prereq.* Dental Hygiene Certificate or instructor's permission.

HSC 4615 Advanced Periodontology 2* (3 q.h.) Latest advances and theories in periodontology. Includes the role of bacteria in pathology, immunopathology, and therapeutic alternatives. Class participation is stressed. *Prereq.* Dental Hygiene Certificate or instructor's permission.

HSC 4700 Advanced Tutorial 1 (3 q.h.) Opportunity to take upper-level course independently. See page 23 for details. *Prereq.* 87 q.h.

*Next offered Fall 1994.

HSC 4701 Advanced Tutorial 2 (3 q.h.)
See HSC 4700.

HSC 4801 Independent Study 1 (3 q.h.)
Opportunity to undertake special research.
See page 24 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

HSC 4802 Independent Study 2 (3 q.h.)
See HSC 4801.

HSC 4803 Independent Study 3 (3 q.h.)
See HSC 4801.

HISTORY

HST 4101 The Civilization of the Ancient and Medieval Worlds (formerly History of Civilization 1) (3 q.h.)

Development of human institutions up to the end of the Middle Ages. Emphasizes the continuities and changes that occur within civilizations and the similarities, differences, and relationships that exist among contemporary civilizations around the world. Explores implications of each historical period for our lives today.

HST 4102 The Civilization of the Early Modern World (formerly History of Civilization 2) (3 q.h.)

The period from the end of the Middle Ages to the French Revolution in 1789. Emphasizes the intellectual, technological, and political expansion of Europe and the reactions of the rest of the world to it. Special attention is given to such topics as the rise of dynastic states, the rise and fall of mercantilism, the scientific revolution, exploration and gunpowder technology, and order and revolution.

HST 4103 The Civilization of the Modern World (formerly History of Civilization 3) (3 q.h.)

The world from 1789 to the present. Includes capitalism, industrialization, nationalism, imperialism, the clash of ideologies in the nineteenth century, and a study of total war in the present century. Based on this historical study, the prospects for the future will be explored.

HST 4110 History of Civilization A (4 q.h.)
Major ideas and institutions of civilizations from ancient times to 1648. *For Alternative Freshman-Year students only. Not open to students who have taken HST 4101 or HST 4102.*

HST 4111 History of Civilization B (4 q.h.)
Continuation of HST 4110, covering the period since 1648. *For Alternative Freshman-Year students only. Not open to students who have taken HST 4102 or HST 4103.*

HST 4201 American History 1763-1848 (formerly American History 1) (3 q.h.)
America from 1763 to 1848, with attention to the development of political, economic, and social institutions in the new republic.

HST 4202 American History 1848-1917 (formerly American History 2) (3 q.h.)
The United States from 1848 to 1917, with attention to the Civil War, economic development thereafter, and the Progressive Era.

HST 4203 American History Since 1917 (formerly American History 3) (3 q.h.)
The United States since 1917, an age of urbanized industrialism and international involvement and crisis.

HST 4241 The Historian's Craft (3 q.h.)
Discussion of ways in which the historian studies the past, with emphasis on research and writing.

HST 4250 Historical Geography (3 q.h.)
Studies the impact of geography on history. This course may be used to satisfy the Standard I geography requirement for students seeking Massachusetts certification as a secondary education teacher of social studies or history.

HST 4263 Oral History (3 q.h.)
Learning history from those who lived it, students conduct tape-recorded interviews of first-hand experiences in a selected area of twentieth-century history. Students need access to an audiotope recorder.

HST 4265 Introduction to Public History (3 q.h.)
Topics include the new discipline of public historical archiving, the construction of historical displays and exhibits, the preservation and restoration of historic sites and structures, the editing of historical documents and journals, the operation of historical societies, and the production of historical media programs.

HST 4270 History and Film (3 q.h.)
Explores the manner in which filmmakers use historical subjects for their projects and the ways in which historians analyze films as primary sources for research. Presents both

dramatic and documentary films in combination with readings from various source and interpretive materials. This course meets for three hours each week. (Thematic Group D) (*Laboratory fee.*)

HST 4301 Technological Transformation of Society (3 q.h.)

The relation between technological innovations and the world in which they take place. Discusses conditions necessary for discovery and innovation and the impact of technology on the political, economic, and social environment. (Thematic Group D)

HST 4302 History of Flight and Space (3 q.h.)

Beginning with the ancient Greeks' and Leonardo da Vinci's dreams of flight, the course traces the history of nonpowered flight from the balloon experiments of the Montgolfier brothers to contemporary hang-gliders; of powered flight from the Wright brothers through supersonic transport; and of rocketry and space travel from their beginnings through the *Enterprise*. (Thematic Group D)

HST 4303 History of the Automobile (3 q.h.)

History of the automobile in Europe and America. Includes invention, production, impact on social and economic life, and the problems of pollution and energy. (Thematic Group D)

HST 4304 History of Energy (3 q.h.)

Examination of how human beings have mobilized the forces of nature to survive, to alter and improve their lifestyles, and to dominate their fellow human beings. Emphasizes the transformation from one energy source to the available alternatives and the reasons for the choices made. Includes the change from human power to animal and machine power, the energy crisis of the sixteenth century, the turning from wood to water and coal power, the rising use of electricity and fossil fuels, the birth of the Atomic Age, and the contemporary history of the oil crisis. (Thematic Group D)

HST 4401 Ancient Middle East (3 q.h.)

Study of ancient cultures and peoples in the Middle East to the rise of Islam.

HST 4403 History of the Jews 1 (3 q.h.)

Cultural and intellectual survey of the Jews from the end of antiquity to early modern times.

HST 4404 History of the Jews 2 (3 q.h.)

Role and position of the Jews in modern history. (Thematic Group A)

HST 4407 Ancient Greece (3 q.h.)

Origin and development of Greek civilization.

HST 4408 Ancient Rome (3 q.h.)

Ancient Roman civilization, emphasizing the rise of the Republic and the decline of the Empire.

HST 4410 The Middle Ages (3 q.h.)

History of Europe from the fall of Rome to 1350.

HST 4412 Islamic History (3 q.h.)

History of the Muslim Arab world from the seventh century to the end of the Abbasid Caliphate in 1258.

HST 4420 Renaissance and Reformation (3 q.h.)

History of Europe from 1350 to 1648, with attention to intellectual, religious, political, and economic developments.

HST 4422 Europe 1648-1789 (3 q.h.)

Europe from the end of the Thirty Years War to the French Revolution.

HST 4423 Europe 1789-1870 (3 q.h.)

Europe from the French Revolution to the Franco-Prussian War with a stress on the struggles for liberalism and nationalism.

HST 4424 Europe 1870-1921 (3 q.h.)

Background of World War I, including nationalism, militarism, imperialism, and the alliance system, as well as the making of war and peace. (Thematic Group C)

HST 4425 Europe Since 1921 (3 q.h.)

Europe after World War I; World War II; the Cold War; and the efforts to unify the continent. (Thematic Group C)

HST 4434 Family History (3 q.h.)

History of the family in Europe and America from 1600 to the present. Includes the changing nature and role of the family, marriage and divorce, child rearing, and aging. (Thematic Group A or E)

HST 4435 Women in European History (3 q.h.)

Historical examination of the position and role of women in European life. (Thematic Group A or E)

HST 4455 Ireland Since 1800 (3 q.h.)

The Irish question in British politics from the Act of Union to the present. (Thematic Group A)

HST 4460 Hitler's Germany (3 q.h.)

Origins and nature of Hitler's Third Reich, emphasizing the personal lives of Nazi leaders in an attempt to understand how seemingly ordinary people could enthusiastically promote wars of aggression and revel in genocidal policies. (Thematic Group C)

HST 4466 Eastern Europe Since 1500 (3 q.h.)

An examination of the salient historical factors which have driven the evolution of Eastern Europe from the Congress of Buda in 1500 which allied Poland and Hungary in anticipation of German and Russian encirclement through the fateful year 1989 which introduced the end of the Iron Curtain and post-World War II domination by the Soviet Union.

HST 4468 Russia Since 1917 (3 q.h.)

The revolutions of 1917 and the subsequent history of the Russian people and government, with special emphasis on foreign relations. (Thematic Group C)

HST 4473 Poland in the Twentieth Century (3 q.h.)

Examines forces leading to Poland's national resurrection in 1918 after more than a century of being a nation without sovereignty; the interwar years of reconstruction and consolidation; partition and near annihilation by Hitler and Stalin in World War II; Cold War engulfment by Communism; Solidarity and the achievement of freedom.

HST 4501 American Indians (3 q.h.)

Survey of native Americans from pre-Columbian times to the present. (Thematic Group A)

HST 4502 Colonial America (3 q.h.)

Topics include exploration and settlement of North America; the development of political, social, and economic institutions; and the international rivalry to 1763.

HST 4503 The American Revolution (3 q.h.)

British-American relations after 1763; war and peace.

HST 4505 The Making of the American Constitution (3 q.h.)

Beginning with the weaknesses of the Articles of Confederation, this course examines the movement for a stronger national gov-

ernment, the drafting of the Constitution and the first twelve amendments, and their implementation in the early years of the Republic.

HST 4506 American Constitutional History, 1835-1910 (3 q.h.)

American constitutional development in the time of Chief Justice Taney; the constitutional impacts of secession and Civil War; post-Civil War Supreme Court cases involving economic affairs, social problems, and individual rights in the terms of Chief Justices Chase, Waite, and Fuller.

HST 4507 American Constitutional History Since 1910 (3 q.h.)

American constitutional development from the Progressive Era to the present, with attention to amendments to the Constitution, the growth of the national government, and Supreme Court cases involving economic affairs, civil liberties, and civil rights.

HST 4508 American Constitutional History: Legislative, Executive, and Judicial Powers (3 q.h.)

An in-depth study of the ways in which the three branches of the American government have exercised the powers afforded them by the Constitution since 1788. Emphasis on the tax and commerce powers of Congress, the foreign affairs and war powers of the President, and the review power of the Supreme Court.

HST 4509 American Constitutional History: Liberties, Privileges, and Immunities (3 q.h.)

An in-depth exploration of the historical evolution of various rights protected by the American Constitution. Topics include freedom of speech, press, association, and religion; equal protection; and the right to privacy.

HST 4510 The American Civil War (3 q.h.)

The history of the American Civil War based on the public broadcasting system telecourse. By incorporating the soldier's view and a variety of other perspectives on the conflict, the programs, lectures, and print materials provide students with a solid foundation of knowledge upon which to base their understanding of the war.

HST 4511 Populism and Progressivism (3 q.h.)

Topical history of the United States from 1890 to 1920, concentrating on its reactions to industrialization and urbanization.

HST 4512 The Age of Roosevelt (3 q.h.)
Topical history of the United States in time of world war, prosperity, depression, and war again.

HST 4513 Contemporary America (3 q.h.)
The American people from the close of World War II to the present. (Thematic Group C)

HST 4523 American Diplomatic History (3 q.h.)
Selected topics in the history of American foreign relations and policy since 1789.

HST 4530 American Economic History (3 q.h.)
Selected topics in the development of the capitalist economy in the United States, with attention to the role of government since 1789. (Thematic Group B)

HST 4531 American Business History (3 q.h.)
Examines the rise of business in America, the role of the corporation, horizontal and vertical combinations, business and labor, and business and government.

HST 4532 History of American Book Publishing (3 q.h.)
The history of book publishing in America from 1640 to the present, with emphasis on the production and marketing of trade and text books, copyright, and the rise of giant houses in the twentieth century. (Thematic Group B or C)

HST 4533 American Newspaper History (3 q.h.)
Newspapers in America from 1690 to the present, with emphasis on the transition from weeklies to dailies, the rise of the political press, the birth of penny papers, the rivalry of Pulitzer and Hearst, and forces making for standardization in the twentieth century. (Thematic Group B or C)

HST 4534 American Magazine History (3 q.h.)
Magazines in America from 1740 to the present, with emphasis on the rise of general and special interest magazines, rivalries, and current problems facing the industry. (Thematic Group B or C)

HST 4535 History of the American Film Industry (3 q.h.)
The production, distribution, and exhibition of feature films in America from the 1890s to the present, with emphasis on the development of studios in California, the rise and fall

of the contract system, censorship, government regulation, and foreign investment. (Thematic Group B, C, or D)

HST 4536 American Radio History (3 q.h.)
Radio in America from the days of Marconi to the present, with emphasis on the coming of commercial stations, the rise of networks, government regulation, the golden age of radio programs, the impact of television, and the nature of radio at the end of the twentieth century. (Thematic Group B, C, or D)

HST 4537 American Television History (formerly HST 4306) (3 q.h.)
Examines the evolution of the medium from the 1920s to the present with emphasis on the development of networks, programming, advertising, the impact of cable, and television's regulatory structure. (Thematic Group B, C, or D)

HST 4540 American Social History (3 q.h.)
Selected topics in the life of the American people since 1789. (Thematic Group B or E)

HST 4542 Women in American History (3 q.h.)
Historical examination of the position and role of women in American life. (Thematic Group B or E)

HST 4543 African-American History (3 q.h.)
History of African Americans from colonial times to the present. (Thematic Group A)

HST 4544 The Negro Baseball Leagues: Baseball and Race Relations in America (3 q.h.)
Covers the history of African-Americans in baseball from the early days of the major leagues in the late nineteenth century through the eventual integration of baseball and the demise of the Negro Leagues in the late 1950s. The exclusion of blacks from the major leagues, the formation of black teams and the Negro Leagues and how these events reflected the larger society will be discussed. The lives of notable personalities, like Moses Fleetwood Walker, the first black player in the major leagues, Rube Foster, the organizer of the Negro Leagues, and Satchel Paige will be studied. There will be guest lectures and videos. (Thematic Group A or B)

HST 4546 Americans at Play: A History of Leisure (3 q.h.)
An examination of 300 years of leisure from the colonial quilting bee to modern profes-

sional football, with special attention to class, gender, and ethnicity and to attempts to regulate leisure activity. (Thematic Group B)

HST 4547 History of Sport in America (3 q.h.)
History of the major sports and their impact on American life. (Thematic Group B)

HST 4548 American Heroes (3 q.h.)
Comparative exploration of the nature and functions of heroism in American history, using such individuals as George Washington, Jesse James, Amelia Earhart, Martin Luther King, and Bruce Springsteen as specific case studies. (Thematic Group B)

HST 4549 American Inquisitions (3 q.h.)
Study of inquisitions in modern America, concentrating on the suppression of radical movements by both government and private groups. (Thematic Group C)

HST 4550 Boston to 1822 (3 q.h.)
Study of the Town of Boston from its establishment in 1630 to 1822 and the development of political, economic, and social institutions.

HST 4551 Boston Since 1822 (3 q.h.)
Study of the City of Boston, its annexations, and the changes in the ethnic nature of the population.

HST 4560 American Legal History to 1850 (3 q.h.)
Focuses on the Common Law tradition and the emergence of a distinctly American law with emphasis on such factors as the American Revolution, Jacksonian Democracy, slavery, and control of the indigent and deviant.

HST 4561 American Legal History since 1850 (3 q.h.)
Focuses on major legal developments since the mid-nineteenth century with emphasis on torts, contract and criminal law, and legal realism.

HST 4602 Contemporary Latin America (3 q.h.)
Social, economic, and political development of the Latin American republics in the twentieth century. (Thematic Group A or C)

HST 4603 The United States, Central America, and the Caribbean (3 q.h.)
Latin American countries nearest the United States and most affected by U.S. policies, particularly Cuba, Mexico, Nicaragua, El

Salvador, and Guatemala. Emphasizes the historical background of current issues. (Thematic Group C)

HST 4604 Mexico Since 1848 (3 q.h.)
Political, economic, social, and cultural evolution of Mexico since the Mexican-American War. Other topics and issues include the Juarez *Reforma*, Diaz's dictatorship, the Revolution of 1910, and the on-going Institutional Revolution.

HST 4606 Canadian History (3 q.h.)
The history of Canada from the time of the European settlement to the present, with emphasis on Canadian relations with the U.S. and the background of the Quebec separatist movement.

HST 4611 Africa Since 1885 (3 q.h.)
The European impact on Africa, the rise of African nationalism, and the emergence of independent African states and their relations with other nations. (Thematic Group C)

HST 4622 Modern Middle East (3 q.h.)
The Middle East since 1914, with attention to Zionism, Pan-Arabism, the effects of two world wars, and the postwar settlements. (Thematic Group C)

HST 4623 Contemporary Middle East 1: The Struggle for Palestine (3 q.h.)
Examines the history of the region from the end of the Second World War to the present with special emphasis on the Arab-Israeli dispute and its impact on the countries involved in or affected by it. (Thematic Group C)

HST 4624 Contemporary Middle East 2: The Persian Gulf (3 q.h.)
Examines the history of the region from the era of the First World War to the present with special emphasis on the impact of oil and the Cold War, the Iran-Iraq war, and the Iraqi seizure of Kuwait. (Thematic Group C)

HST 4632 China Since 1850 (3 q.h.)
A century of China's history, emphasizing the Western impact on Chinese civilization, China's struggle to maintain independence, and the victory of communism in the mid-twentieth century. (Thematic Group A)

HST 4636 Japan Since 1850 (3 q.h.)
Analysis of Japanese domestic developments and foreign relations since the mid-nineteenth century. (Thematic Group A)

HST 4640 Third World Women (3 q.h.)
Role of women in the less developed, Third World areas, with special emphasis on aspects of change, development, and continuity. (Thematic Group E)

HST 4643 Peacekeeping and Arms Control (3 q.h.)

A history of twentieth century efforts to control, regulate, stabilize, or prevent international violence, including the Hague and Geneva Conventions, the League of Nations and the United Nations, alliance systems and deterrence, bilateral and multilateral treaties, verification issues and technologies, and other relevant matters. (Thematic Group C or D)

HST 4644 War and Peace in the Nuclear Age (3 q.h.)

The history of the nuclear age based on a Corporation for Public Broadcasting/Annenberg telecourse. By incorporating a variety of perspectives on the nuclear past—political, historical, philosophical, and scientific—the programs, lectures, and accompanying print materials provide students with a solid foundation of knowledge upon which they can base their views of the nuclear future. (Thematic Group C)

HST 4645 History of the Vietnam Wars (3 q.h.)

History of military conflict in Vietnam, with attention to the rise of the Viet Minh during World War II, the struggle against the French in the first Indochina War, the impact of the Cold War, and the involvement of the United States after 1950 in Laos and Cambodia (now Kampuchea) as well as in Vietnam. Emphasizes the role of communism and nationalism in Indochina and the motives for American intervention. Includes films revealing American reaction to the escalating conflict. (Thematic Group C)

HST 4646 The Legacy of the Vietnam Wars (3 q.h.)

Examines the impact of the American involvement in Vietnam on American foreign and domestic policy as well as on American attitudes toward themselves and toward the world in the period since 1975. Emphasis will be placed on post-war interpretations of that conflict, on its effects on American ideals, on ideas of military preparedness, on the economy, on popular culture, and on the "healing processes" that have marked the

last decade. An assessment of the extent to which Vietnam continues to haunt the American people and the extent to which the country has put the experience behind it will be made and an agenda for future action set forth by the class. (Thematic Group C)

HST 4811 Honors Program 1 (4 q.h.)

Opportunity to undertake an in-depth research study project. See page 24 for details. *Prereq.* 96 q.h., 3.5 q.p.a. (Thematic Group F)

HST 4812 Honors Program 2 (4 q.h.)

See HST 4811.

HST 4813 Honors Program 3 (4 q.h.)

See HST 4811.

HST 4815 Advanced Tutorial 1 (3 q.h.)

Opportunity to take an upper-level course independently. See page 23 for details. *Prereq.* 87 q.h.

HST 4816 Advanced Tutorial 2 (3 q.h.)

See HST 4815.

HST 4821 Field Work in History (6 q.h.)

Designed to enhance career development by allowing students to earn credit for the application of their academic backgrounds to practical problems in the work place. See page 23 for details. *Prereq.* HST 4101, 4102, 4103, 4202, 4203, 4241, and Program Director's approval.

HST 4822 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 24 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

HST 4823 Independent Study 2 (3 q.h.)

See HST 4822.

HST 4824 Independent Study 3 (3 q.h.)

See HST 4822.

HST 4825 Directed Study in Historical Geography (3 q.h.)

Offers directed study in geography's impact on history. This course may be used to satisfy the Standard I geography requirement for students seeking Massachusetts certification as a secondary education teacher of social studies or history. (*Not a regularly scheduled course. Students must contact Liberal Arts Office to register to work with an instructor.*)

HOTEL AND RESTAURANT MANAGEMENT

HTL 4301 Introduction to Hotel and Restaurant Management (3 q.h.)

The hospitality industry in today's economy. Emphasis is on industry growth and development, management problems, and principles of hotel and restaurant management.

HTL 4303 Front Office Management (3 q.h.)

Role and functions of the front office as they relate to the operation of the entire hotel. Covers front office structure, registration, payment, reservations, and night audit.

HTL 4304 Hotel and Restaurant Law (3 q.h.)

Introduction to the fundamental laws, rules, and regulations applicable to the hospitality industry. Includes hospitality management policies that minimize the danger of legal liability; innkeeping; restaurant management; alcoholic beverage control; labor laws; and legislation affecting the hospitality industry.

HTL 4305 Food Preparation 1 (3 q.h.)

Introduction to the fundamentals of food preparation and service, with emphasis on food service industry terminology and equipment. Includes menu planning, requisitioning, pricing, and preparation and service. In addition to classroom instruction, students prepare food in a small-quantity laboratory. (*Laboratory fee.*)

HTL 4306 Food Preparation 2 (3 q.h.)

Continuation of HTL 4305. *Prereq.* HTL 4305. (*Laboratory fee.*)

HTL 4307 Food Service Sanitation (3 q.h.)

Organization of the maintenance and engineering function. Includes the technical information necessary to establish effective preventive programs. Details the fundamentals of sanitation for food service employees and includes practical guidelines for safe food handling. Provides the future hospitality manager with an opportunity for certification in Applied Food Service Sanitation from the National Institute for the Food Service Industry.

HTL 4308 Food and Beverage Cost Control (3 q.h.)

Introduction to management attitudes toward cost controls through analysis of all aspects of the food service operation. Includes classification of food service facilities,

cost accounting, purchasing, inventory, production control methods, and the essentials of food and beverage controls. Develops management-mindedness through examination of organizational structures of food service and specific topics, such as menu pricing, break-even analysis, and cost-volume-profit theory. Emphasizes forecasting and achieving a profitable bottom line.

HTL 4309 Managerial Accounting for the Hospitality Industry (3 q.h.)

Financial practices and systems used in the hospitality industry. Analyzes controls, budgeting, financial statements, and specialized industry accounting procedures. *Prereq.* ACC 4102.

HTL 4310 Hospitality Marketing Management (3 q.h.)

The market in which the hospitality industry operates. Students have the opportunity to develop and implement a marketing plan to meet operational goals. *Prereq.* MKT 4301.

HTL 4313 Introduction to Tourism (3 q.h.)

Introduction to the science, art, and business of attracting, transporting, and accommodating visitors and graciously catering to their needs and wants. Includes sociological and psychological aspects, marketing, and the economics of tourism.

HTL 4320 Food Preparation (Intensive) (6 q.h.)

Same as HTL 4305 and HTL 4306. (*Laboratory fee.*)

HTL 4322 Consumer Food Preparation (3 q.h.)

Concepts and skills learned in HTL 4305 and HTL 4306 are applied in a restaurant setting. Preparation of complete menus for a service dining room, including appetizers, soups, salads, entrees, vegetables, and desserts. Stresses costing, menu planning, quantity recipe production, menu terminology, and kitchen organization. Coordinates food production with students in the dining room service course (HTL 4324). Work in a classic kitchen stations on a rotating basis. *Prereq.* HTL 4306 or HTL 4320. (*Laboratory fee.*)

HTL 4324 Dining Room Beverage Operation and Preparation (3 q.h.)

Introduction to the operation of a dining room with beverage service. Includes organization, personnel, methods of table service, menu terminology, table arrangement, requirements for supplies and equipment,

sales promotion techniques, and revenue control. Students serve meals prepared by students in the food production course (HTL 4322). Also covers wine service and alcoholic beverage preparation and control. (*Laboratory fee.*) *Prereq.* HTL 4301.

HTL 4331 Professional Chef's Training (formerly HTL 4325 Intensive Chef's Training) (6 q.h.)

This course is for the individual who already has a culinary background and wishes to continue to upgrade his/her skills and understanding of the changing role of today's food industry. The course explores two avenues, a greater understanding between chef and management, along with the preparation of finer cuisine for hotels, restaurants, clubs, catering and buffet. The practical demonstrations will include hors d'oeuvres through fancy desserts. Tableside and wine cookery, ice carving and extensive menu planning will be included. An all-round way to gain more culinary expertise. (*Laboratory fee.*)

HTL 4600 Honors Program 1 (4 q.h.)
Opportunity to undertake an in-depth research study project. See page 24 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

HTL 4601 Honors Program 2 (4 q.h.)
See HTL 4600.

HTL 4602 Honors Program 3 (4 q.h.)
See HTL 4600.

HTL 4701 Independent Study 1 (3 q.h.)
Opportunity to undertake special research. See page 24 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

HTL 4702 Independent Study 2 (3 q.h.)
See HTL 4701.

HTL 4703 Independent Study 3 (3 q.h.)
See HTL 4701.

HTL 4800 Advanced Tutorial 1 (3 q.h.)
Opportunity to take upper-level course independently. See page 23 for details. *Prereq.* 87 q.h.

HTL 4801 Advanced Tutorial 2 (3 q.h.)
See HTL 4800.

INTERDISCIPLINARY

INT 4110 Managing Career Decisions (3 q.h.)
Understanding the importance of taking control of one's life and career decisions. Students complete a self-assessment includ-

ing an evaluation of skills and competencies, values, interests, and personal style. Students explore a variety of career options both through library research and field surveys. Emphasis on decision-making, goal setting, and implementing career and educational plans. Overview of job campaign includes introduction to resume preparation, network development, and interviewing techniques.

INT 4112 Career Action Planning (1 q.h.)
For students who are fairly clear about direction and preparing for a job search campaign. A day-long session intended to help students sharpen their job hunting skills for today's economy. In the morning, students will develop effective strategies for job searching in today's market. Particular attention will be given to developing and using a network of professional contacts. Job search correspondence, including resumes and cover letters, will be reviewed. In the afternoon, students will develop a presentation statement. Interviewing skills will also be covered, with special attention given to preparing for interviews, handling different questions, and negotiating salary and benefits. Finally, students will set realistic goals for their job search and develop an action plan on meeting those goals.

INT 4114 Career Decision-Making (1 q.h.)
For students who are unclear about career direction. A day-long session intended to help students develop self understanding which is the basis of sound career decisions. Through individual and group activities participants will identify their skills and interests, assess their work and personal values, and address personality and lifestyle preferences. Participants will also begin to explore occupational and labor market information relevant to potential career interests. Techniques for conducting career research will be presented and practiced. Students will then be introduced to a decision-making model and given an opportunity to develop a preliminary action plan by identifying next steps for themselves in the career development process.

INT 4200 Workshop in Creativity (formerly The Creative Process) (3 q.h.)
Thought processes that allow individuals to be creative or original in all areas of life. Through interactive exercises and special projects in composition and problem-solving, students can learn how to tap their own creativity. Students are asked to create an

original piece of art, music, literature, or research.

INT 4203 Independent Study in Cultural Heritage (3 q.h.)

Student will work one-on-one with a faculty member to complete a project he/she designs to study the interconnected ways in which art, music, literature, religion, and specific historical events have shaped our culture, values, and self-perceptions. Projects should deal with one or more themes included in Cultural Heritage studies for Liberal Studies B.A. degree (see page 123). *Prereq. 27 q.h. in Cultural Heritage Studies or instructor's permission. Open only to Liberal Studies degree candidates.*

INT 4204 Independent Study in Contemporary Studies (3 q.h.)

Student will work one-on-one with a faculty member to complete a project he/she designs to analyze and discuss selected problems of the contemporary world, using analytical tools appropriate to the disciplines contained within the Liberal Studies curriculum (see page 123). *Prereq. 27 q.h. in Contemporary Studies or instructor's permission. Open only to Liberal Studies degree candidates.*

JOURNALISM

JRN 4112 Writing for Media 1 (formerly Fundamentals of Newswriting) (3 q.h.)

Introduction to how to write leads, organize basic news stories, gather facts, and interview. Analyzes news values and the structure of news organizations.

JRN 4113 Writing for Media 2 (formerly Newsgathering and Reporting) (3 q.h.)

Writing of multisource stories, both news and feature; public affairs reporting; advanced interviewing techniques; and legal issues. *Prereq. JRN 4112 or equiv.*

JRN 4114 News Reporting Techniques (3 q.h.)

Introduction to writing in-depth stories requiring significant research and introduction to investigative reporting. Includes libel, privacy invasion, and other legal matters affecting news media. *Prereq. JRN 4113 or instructor's permission.*

JRN 4300 Photojournalism (3 q.h.)

Introduction to how to use the camera, the negative, and the print in news or feature

stories. Includes weekly photo shooting assignments.

JRN 4330 The Newspaper Cartoon: Its Techniques and History (3 q.h.)

How the political cartoon and comic strip have influenced American culture from the late 1800s through the 20th century. This course is for those interested in the political scene as well as those interested in careers in cartooning. Being an artist is not a prerequisite.

JRN 4335 Public Relations Basics (3 q.h.)

Concepts, components, and methods of public relations, including planning and research, processes of influencing public opinion, and policies concerning corporate and institutional relations with the media and various publics.

JRN 4336 Public Relations Practice (3 q.h.)

Study of specific practices and techniques employed in public relations, especially in relation to the handling of information and organization of activities and events. Also discusses how to define PR "targets" and how to deal with such publics as employees, stockholders, and consumers.

JRN 4337 Public Relations Problems (3 q.h.)

Research and communication techniques used to solve public relations problems and practical experience with individual PR projects, programs, and campaigns.

JRN 4338 Public Relations for Nonprofit Organizations (3 q.h.)

Explores functions of the public relations practitioner in a non-profit setting, including media relations, development, external and internal relations, and strategic planning. Students will be expected to develop a public relations plan for a non-profit institution.

JRN 4340 Press, Power, and Critical Issues (3 q.h.)

Study of the impact of news media coverage on major political, economic, and other issues. The increasingly complex relationship between American society and print and broadcast journalism is analyzed.

JRN 4341 Mass Media and the Law (3 q.h.)

Examination of libel, privacy, protection of sources and broadcast regulation. Conflicts between journalists and jurists over prior restraint, access to government information, and fundamental First Amendment issues

also are discussed. Students will be expected to complete a research assignment in a law library.

JRN 4349 Advertising Basics (3 q.h.)

Study of the evolution of advertising, including social, economic, and legal aspects; how advertising agencies and departments function; how advertising fits into the marketing mix; and the basic steps of research.

JRN 4350 Advertising Copywriting (3 q.h.)

Writing effective advertising copy for both print and electronic media; coordinating copy with other creative functions. Elements of good ad copy are analyzed and common pitfalls are reviewed.

JRN 4351 Advertising Practice (3 q.h.)

Study of media planning and selection. Includes defining objectives and determining target audiences; establishing the advertising budget; analyzing the market and the competition.

JRN 4480 Copyediting (3 q.h.)

Practice in the many facets of the editorial process, including editing copy, writing heads, and laying out pages. The course also includes photo selection, cropping, and outline writing. *Prereq.* JRN 4112.

JRN 4522 Magazine Writing (3 q.h.)

Practice in writing and freelancing magazine articles. Analysis of magazine markets, preparation of query letters, techniques of research, and submission of manuscript. Travel, how-to, profile, personal experience, and other formats included.

JRN 4540 Writing the Non-Fiction Manuscript (3 q.h.)

This course surveys today's market for the journalistic, non-fiction book and articles and describes methods for selecting a researchable topic, finding the facts, writing the query letter, writing the manuscript, and doing revisions and final draft.

JRN 4560 Developing Writing Style (3 q.h.)

Developing and refining personal style in journalistic, non-fiction writing. Emphasis is placed on original and effective approaches to features, columns, reviews, editorials and longer works.

JRN 4815 Advanced Tutorial 1 (3 q.h.)

Opportunity to take an upper-level course independently. See page 23 for details.

JRN 4816 Advanced Tutorial 2 (3 q.h.)
See JRN 4815.

LANGUAGE — FRENCH

LNF 4101 Conversational French 1 (formerly Elementary French 1) (4 q.h.)

Essentials of grammar, practice in pronunciation, and progressive acquisition of a basic vocabulary and idiomatic expressions.

LNF 4102 Conversational French 2 (formerly Elementary French 2) (4 q.h.)

Continuation of grammar study, with oral and written exercises. *Prereq.* LNF 4101 or *equiv.*

LNF 4103 Conversational French 3 (formerly Elementary French 3) (4 q.h.)

Reading of French prose of increasing difficulty, with written and oral exercises based on the materials read and practice in conversation. *Prereq.* LNF 4102 or *equiv.*

LNF 4104 Intermediate French 1 (4 q.h.)

Review of grammar, with practice in composition and conversation. *Prereq.* LNF 4103 or *equiv.*

LNF 4105 Intermediate French 2 (4 q.h.)

History of French civilization, with discussions and conversation. *Prereq.* LNF 4104 or *equiv.*

LNF 4106 Intermediate French 3 (4 q.h.)

Intensive reading of modern French prose, with practice in conversation. *Prereq.* LNF 4105 or *equiv.*

LNF 4815 French Advanced Tutorial 1 (4 q.h.)

Advanced Tutorial Option: When a student is unable to continue study of an upper-level language, or when a language course needed for a degree is not scheduled at appropriate intervals, arrangements can be made for the student to take three advanced tutorials for a total of twelve quarter hours. See page 23 for details. *Prereq.* 87 q.h.

LNF 4816 French Advanced Tutorial 2 (4 q.h.)
See LNF 4815.

LNF 4817 French Advanced Tutorial 3 (4 q.h.)
See LNF 4815.

LANGUAGE — GERMAN

LNG 4101 Conversational German 1
(formerly Elementary German 1) (4 q.h.)
Essentials of grammar, practice in pronunciation, and progressive acquisition of a basic vocabulary and idiomatic expressions.

LNG 4102 Conversational German 2
(formerly Elementary German 2) (4 q.h.)
The more difficult points of grammar, particularly the uses of the subjunctive mood. *Prereq.* LNG 4101 or *equiv.*

LNG 4103 Conversational German 3
(formerly Elementary German 3) (4 q.h.)
Reading of simple German prose, with oral and written exercises based on material read. Conversation in German is encouraged. *Prereq.* LNG 4102 or *equiv.*

LNG 4104 Intermediate German 1 (4 q.h.)
Review of grammar, with practice in composition and conversation. *Prereq.* LNG 4103 or *equiv.*

LNG 4105 Intermediate German 2 (4 q.h.)
History of German civilization, with discussions and conversation. *Prereq.* LNG 4104 or *equiv.*

LNG 4106 Intermediate German 3 (4 q.h.)
Intensive reading of modern German prose, with practice in conversation. *Prereq.* LNG 4105 or *equiv.*

LNG 4815 German Advanced Tutorial 1
(4 q.h.)
Advanced Tutorial Option: When a student is unable to continue study of an upper-level language, or when a language course needed for a degree is not scheduled at appropriate intervals, arrangements can be made for the student to take three advanced tutorials for a total of twelve quarter hours. See page 23 for details. *Prereq.* 87 q.h.

LNG 4816 German Advanced Tutorial 2
(4 q.h.)
See LNG 4815.

LNG 4817 German Advanced Tutorial 3
(4 q.h.)
See LNG 4815.

LANGUAGE — ITALIAN

LNI 4101 Conversational Italian 1 (formerly Elementary Italian 1) (4 q.h.)
Essentials of grammar, practice in pronun-

ciation, and progressive acquisition of a basic vocabulary and idiomatic expressions.

LNI 4102 Conversational Italian 2 (formerly Elementary Italian 2) (4 q.h.)
Continuation of grammar study, with oral and written exercises. *Prereq.* LNI 4101 or *equiv.*

LNI 4103 Conversational Italian 3 (formerly Elementary Italian 3) (4 q.h.)
Reading of Italian prose of increasing difficulty, with written and oral exercises based on the material read. Practice in conversation. *Prereq.* LNI 4102 or *equiv.*

LNI 4104 Intermediate Italian 1 (4 q.h.)
Review of grammar, with practice in composition and conversation. *Prereq.* LNI 4103 or *equiv.*

LNI 4105 Intermediate Italian 2 (4 q.h.)
History of Italian civilization, with discussions and conversation. *Prereq.* LNI 4104 or *equiv.*

LNI 4106 Intermediate Italian 3 (4 q.h.)
Intensive reading of modern Italian prose, with practice in conversation. *Prereq.* LNI 4105 or *equiv.*

LNI 4815 Italian Advanced Tutorial 1 (4 q.h.)
Advanced Tutorial Option: When a student is unable to continue study of an upper-level language, or when a language course needed for a degree is not scheduled at appropriate intervals, arrangements can be made for the student to take three advanced tutorials for a total of twelve quarter hours. See page 23 for details. *Prereq.* 87 q.h.

LNI 4816 Italian Advanced Tutorial 2 (4 q.h.)
See LNI 4815.

LNI 4817 Italian Advanced Tutorial 3 (4 q.h.)
See LNI 4815.

LANGUAGE — JAPANESE

LNJ 4101 Conversational Japanese 1
(formerly Elementary Japanese 1) (4 q.h.)
Basic, practical Japanese, emphasizing the essentials of grammar, pronunciation, progressive acquisition of a core vocabulary, and the use of current, idiomatic expressions.

LNJ 4102 Conversational Japanese 2
(formerly Elementary Japanese 2) (4 q.h.)
Continuation of LNJ 4101. Progressive ac-

quisition of practical skills. *Prereq.* LNJ 4101 or *equiv.*

LNJ 4103 Conversational Japanese 3
(formerly Elementary Japanese 3) (4 q.h.)
Continuation of LNJ 4102. *Prereq.* LNJ 4102.

LNJ 4104 Intermediate Japanese 1 (4 q.h.)
Review of grammar, with practice in composition and conversation. *Prereq.* LNJ 4103 or *equiv.*

LNJ 4105 Intermediate Japanese 2 (4 q.h.)
History of Japanese civilization, with discussions and conversation. *Prereq.* LNJ 4104 or *equiv.*

LNJ 4106 Intermediate Japanese 3 (4 q.h.)
Intensive reading of Japanese prose, with practice in conversation. *Prereq.* LNJ 4105 or *equiv.*

LNJ 4225 Japanese Culture (3 q.h.)
By studying various aspects of Japanese cultural history, education, work ethics, male-female relations, and other areas, students gain insight into the Japanese mentality and how this homogeneous race is surviving in a heterogeneous world.

LNJ 4815 Japanese Advanced Tutorial 1
(4 q.h.)
Advanced Tutorial Option: When a student is unable to continue study of an upper-level language, or when a language course needed for a degree is not scheduled at appropriate intervals, arrangements can be made for the student to take three advanced tutorials for a total of twelve quarter hours. See page 23 for details. *Prereq.* 87 q.h.

LNJ 4816 Japanese Advanced Tutorial 2
(4 q.h.)
See LNJ 4815.

LNJ 4817 Japanese Advanced Tutorial 3
(4 q.h.)
See LNJ 4815.

LANGUAGE — SWEDISH

LNN 4101 Conversational Swedish 1 (4 q.h.)
Acquisition of basic oral skills by introduction of the essentials of Swedish grammar, with extensive practice in pronunciation and acquisition of an idiomatic core vocabulary.

LNN 4102 Conversational Swedish 2 (4 q.h.)
Continuation of LNN 4101. Introduces

Swedish prose of moderate difficulty. *Prereq.* LNN 4101 or *equiv.*

LNN 4103 Conversational Swedish 3 (4 q.h.)
Continuation of LNN 4102. *Prereq.* LNN 4102 or *equiv.*

LNN 4815 Swedish Advanced Tutorial 1
(4 q.h.)
Advanced Tutorial Option: When a student is unable to continue study of an upper-level language, or when a language course needed for a degree is not scheduled at appropriate intervals, arrangements can be made for the student to take three advanced tutorials for a total of twelve quarter hours. See page 23 for details. *Prereq.* 87 q.h.

LNN 4816 Swedish Advanced Tutorial 2
(4 q.h.)
See LNN 4815.

LNN 4817 Swedish Advanced Tutorial 3
(4 q.h.)
See LNN 4815.

LANGUAGE — RUSSIAN

LNR 4101 Conversational Russian 1
(formerly Elementary Russian 1) (4 q.h.)
Essentials of grammar, practice in pronunciation, and progressive acquisition of a basic vocabulary and idiomatic expressions.

LNR 4102 Conversational Russian 2
(formerly Elementary Russian 2) (4 q.h.)
Continuation of grammar study, with oral and written exercises. *Prereq.* LNR 4101 or *equiv.*

LNR 4103 Conversational Russian 3
(formerly Elementary Russian 3) (4 q.h.)
Reading of Russian prose of increasing difficulty, with written and oral exercises based on the material read and practice in conversation. *Prereq.* LNR 4102 or *equiv.*

LNR 4225 Russian Culture and Society
(3 q.h.)
Study of various aspects of Russian cultural history, education, work ethics, male-female relations, and other areas, for insight into the Russian mentality.

LNR 4815 Russian Advanced Tutorial 1
(4 q.h.)
Advanced Tutorial Option: When a student is unable to continue study of an upper-level language, or when a language course needed for a degree is not scheduled at appropriate

intervals, arrangements can be made for the student to take three advanced tutorials for a total of twelve quarter hours. See page 23 for details. *Prereq.* 87 q.h.

LNR 4816 Russian Advanced Tutorial 2 (4 q.h.)
See LNR 4815.

LNR 4817 Russian Advanced Tutorial 3 (4 q.h.)
See LNR 4815.

LANGUAGE — SPANISH

LNS 4101 Conversational Spanish 1 (4 q.h.)
Acquisition of basic oral skills by introduction of the essentials of Spanish grammar. Extensive practice in pronunciation and acquisition of an idiomatic core vocabulary.

LNS 4102 Conversational Spanish 2 (4 q.h.)
Continuation of LNS 4101. Introduces Spanish prose of moderate difficulty. *Prereq.* LNS 4101 or equiv.

LNS 4103 Conversational Spanish 3 (4 q.h.)
Continuation of LNS 4102. Continued stress on conversation, while building a solid vocabulary. *Prereq.* LNS 4102 or equiv.

LNS 4104 Intermediate Spanish 1 (4 q.h.)
Review of grammar, with practice in composition and conversation. *Prereq.* LNS 4103 or equiv.

LNS 4105 Intermediate Spanish 2 (4 q.h.)
Examination of Spanish civilization through texts of average difficulty. Intensive reading of modern prose, with occasional oral or written translation and conversation practice based on assigned readings. *Prereq.* LNS 4104 or equiv.

LNS 4106 Intermediate Spanish 3 (4 q.h.)
Examination of Spanish-American civilization through texts of average difficulty. Intensive readings of modern prose, with occasional oral or written translations and conversation practice based on assigned readings. *Prereq.* LNS 4105 or equiv.

LNS 4200 Spanish for the Medical Professions (4 q.h.)
Students are introduced to the specialized discourse of the medical professions. The differences between oral and written language styles will be addressed, as well as the differing requirements for levels of style,

ranging from informal to formal. *Prereq.* LNS 4106 or instructor's permission.

LNS 4815 Spanish Advanced Tutorial 1 (4 q.h.)

Advanced Tutorial Option: When a student is unable to continue study of an upper-level language, or when a language course needed for a degree is not scheduled at appropriate intervals, arrangements can be made for the student to take three advanced tutorials for a total of twelve quarter hours. See page 23 for details. *Prereq.* 87 q.h.

LNS 4816 Spanish Advanced Tutorial 2 (4 q.h.)
See LNS 4815.

LNS 4817 Spanish Advanced Tutorial 3 (4 q.h.)
See LNS 4815.

MANAGEMENT

MGT 4101 Introduction to Business and Management 1 (3 q.h.)
Study of the setting and general structure of American business, including objectives and practices affecting the American standard of living. Examines the characteristics of private enterprise and the nature and challenge of capitalism and other forms of economic enterprise. Introduces types of businesses, the structures of organizations, and the functions of management as well as what a managerial career involves, what problems must be faced, and what decisions must be reached.

MGT 4102 Introduction to Business and Management 2 (3 q.h.)
Methodologies in planning, organizing, directing, and controlling production, marketing, sales, and pricing within the American free enterprise system and in contrast to other business systems. Examines techniques for coping with the intricacies of systems management. *Prereq.* MGT 4101.

MGT 4103 Introduction to Business and Management 3 (3 q.h.)
Basic management concepts and techniques necessary to successful decision-making. Emphasizes management as a continuous, active process by introducing methods of designing an organization; understanding and dealing with people; evaluating the political, social, and economic environment; and effectively planning, directing, and controlling an organization. *Prereq.* MGT 4102.

MGT 4105 Introduction to Business and Management (Intensive) (6 q.h.)
Same as MGT 4101 and MGT 4102.

MGT 4110 Survey of Business and Management (4 q.h.)

Introduction to the setting and general structure of American business, the characteristics of private enterprise, and the nature and challenge of capitalism and other forms of economic enterprise. Covers the forms of business, organizational structure, and functions of management. Through lectures and class discussion, students are given an overview of the methodologies used in planning, organizing, directing, and controlling the functions of production marketing, sales, pricing, and finance. *For Alternative Freshman-Year students only.*

MGT 4320 Managing Change (3 q.h.)

Application of managerial concepts and practices to real-world situations with policy or resource constraints. Explores decision making related to the impact of change on the organization and its personnel: develops a conceptual framework for handling change in one's own business career. *Prereq. MGT 4102.*

MGT 4323 Management and Leadership

(formerly Motivation Management) (3 q.h.)
Designed to help students differentiate between the managerial position as such and a leadership role, evaluating the impact of leadership and management styles on human behavior. Introduces and analyzes important motivation concepts through study of the working environment and the processes that influence both performance and outcome. *Prereq. MGT 4102.*

MGT 4328 Creating New Ventures (3 q.h.)

The nature of entrepreneurship and potential for self-employment by the individual. Includes the sequence from generation of an idea through the design of a plan for owning and operating a small business. *Prereq. MGT 4102.*

MGT 4329 Managing Small Businesses (3 q.h.)

Study of managerial operations of a small business. Presents issues and problems encountered by those considering entrepreneurial and small business endeavors, including the facets of financing, planning, market research, and strategy for small businesses. *Prereq. MGT 4102.*

MGT 4330 Essentials for Managers of Small Businesses (3 q.h.)

Designed for small business entrepreneurs or persons interested in running a small business. Covers fundamental business concepts, including ownership forms; ongoing market research, capitalization, and management and operating issues; personnel and benefits; risk management; tax considerations; operating finances; and small business strategic positioning. Generally offered in six half-day sessions.

MGT 4340 Small Business 1 (3 q.h.)

Development and completion of a full business plan for entrepreneurs or persons interested in operating a small business. Covers the nature and characteristics of entrepreneurship; personal analysis; generation of ideas and market identification; legal and tax ramification of ownership forms; marketing research and planning.

MGT 4341 Small Business 2 (3 q.h.)

The marketing research and development of the marketing plan portion of the overall business plan. Topics include new business capital requirements, including the differences in venture and equity funding; and developing the financial management plan portion of the overall business plan, along with business strategy implications, personnel matters, and the use of computers. *Prereq. MGT 4340.*

MGT 4354 Management and the Environment (3 q.h.)

This course examines and discusses current rules and regulations addressing important and critical issues facing society as a whole—the environment in which we work and live. It considers the effect on managerial decision-making imposed by environmental issues facing organizations; considers how rules and regulations apply to different industries; discusses role(s) played by governmental agencies in implementing regulations; and, how the agencies and our legal system are used in enforcement. Prospective organizational accountability, responsibilities and possible managerial actions/activity which may be required for dealing with both present and future environmental issues will also be discussed.

MGT 4357 Cultural Issues in International Business (3 q.h.)

When a U.S. company opens an office in a foreign land, cultural clashes may occur. How

does management cope and help its employees to cope with these differences? This course examines the problems of doing business in another country, including third-world countries.

MGT 4358 Today's Management Issues
(3 q.h.)

Study business and management issues affecting today's management decisions. Includes changes in our economic system and the economy; corporate culture; social responsibility; ethics; worker's needs, motivation, and satisfaction; demographics; and management-labor interactions. *Prereq.* MGT 4102.

MGT 4362 Advanced Managerial Seminar
(3 q.h.)

The managerial seminar provides upper-level undergraduate students an opportunity to examine/research a broad managerial or an interdisciplinary set of organizational/managerial issues. Selection and focusing of the topic/theme is guided by the instructor and may be pertinent to their professional work, career preparation or personal enrichment. A variety of research techniques is available for use and written report of the undertaking is submitted. *Prereq.* 100 q.h. and completion of all core business courses in your major.

MGT 4410 Project Management Process: Planning and Implementation (Reserved)
(formerly Project Planning and Control)
(3 q.h.)

The entire process of implementing a project, from project definition to the evaluation of feasibility, scheduling, and financial and budgetary factors. Management techniques and requirements are used in case analyses, along with the concept of using computer software to help oversee projects. *Prereq.* OM 4401 or OM 4301 and 80 q.h.

MGT 4411 Advanced Project Management Process (Reserved) (3 q.h.)

This course broadens an operational and staff manager's conceptual knowledge and expands the usage for program/project management. Analyzing comprehensive cases—covering both products and services—students gain insight into the enlarging scope of business, operational and workplace activities where program/project management can be successfully applied. Expanding utilization makes a widening ar-

ray of processes more efficient, productive, and contributes to better overall quality. *Prereq.* MGT 4410.

MGT 4446 International Business Management and Operations (Reserved)
(formerly MGT 4456) (3 q.h.)

Principles and practices of international business, comparing domestic and international business activities, responsibilities, and influences. Explores the economic, social, political, and legal contexts of conducting business in a multinational environment and examines how the "foreign" factor in the business equation influences behavior. *Prereq.* MGT 4102.

MGT 4450 Business Policy 1 (Reserved)
(3 q.h.)

For advanced students building on all previous management courses and on numerous functional and procedural courses. Examines the total management process for formulating business strategy. Covers the development of corporate objectives, plans, and policies, emphasizing the interaction between the enterprise and its environment, both national and international. The economic and social responsibilities of business and managers are also considered. *Prereq.* 100 q.h. and completion of all core business courses in your major.

MGT 4451 Business Policy 2 (Reserved)
(3 q.h.)

Study of organizational and administrative methods for converting plans into achievements. Explores concepts of strategic planning and implementation from the perspective of the general manager, with attention to top management functions, responsibilities, styles, values, and organizational relationships. Includes cases from profit and non-profit enterprises of various types. *Prereq.* MGT 4450.

MGT 4452 Business Policy Intensive (Reserved) (6 q.h.)

Same as MGT 4450 and MGT 4451. *Prereq.* 100 q.h.

MGT 4455 Manager and Society (Reserved)
(3 q.h.)

For managers, potential managers, and others interested in the national and international issues confronting business and industry in their relationships with governments, societies, and individuals. Includes

issues of changing work environments and the variety of influences and pressures that need to be taken into account when making socially responsible business decisions. *Prereq.* MGT 4102.

MGT 4600 Honors Program 1 (4 q.h.)
Opportunity to undertake an in-depth research study project. See page 24 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

MGT 4601 Honors Program 2 (4 q.h.)
See MGT 4600.

MGT 4602 Honors Program 3 (4 q.h.)
See MGT 4600.

MGT 4701 Independent Study 1 (3 q.h.)
Opportunity to undertake special research. See page 24 for details. *Prereq.* 96 q.h., 3.0 q.p.a..

MGT 4702 Independent Study 2 (3 q.h.)
See MGT 4701.

MGT 4703 Independent Study 3 (3 q.h.)
See MGT 4701.

MGT 4800 Advanced Tutorial 1 (3 q.h.)
Opportunity to take upper-level course independently. See page 23 for details. *Prereq.* 87 q.h.

MGT 4801 Advanced Tutorial 2 (3 q.h.)
See MGT 4800.

MANAGEMENT INFORMATION SYSTEMS

MIS 4101 Introduction to Data Processing and Information Systems 1 (3 q.h.)
Introduction to data processing and computers, including an overview of data processing history, business data processing concepts, data processing organization, computer hardware, the internal representation of data, and data communication concepts. In-class demonstration of DOS, word processing, and spreadsheets. Computer labs for students' completion of projects available at Boston, Burlington, Dedham, Framingham, and Liberty Square. Students may also complete projects on any IBM or IBM-compatible computer available to them.

MIS 4102 Introduction to Data Processing and Information Systems 2 (3 q.h.)
Continuation of MIS 4101. Concentrates on software and systems. Includes the systems-development life cycle, programming tools

and program preparation, the use of computers for specific business applications, database management systems, and high-level programming and planning languages. Class consists of in-class demonstration by instructor on database software. Computer labs for students' completion of projects available at Boston, Burlington, Dedham, Framingham, and Liberty Square. Students may also complete projects on any IBM or IBM-compatible computer available to them. *Prereq.* MIS 4101.

MIS 4103 Introduction to Data Processing and Information Systems (Intensive) (6 q.h.)
Covers material in MIS 4101 and MIS 4102 in one quarter.

MIS 4221 COBOL Programming 1 (3 q.h.)
Beginning computer problem-solving and programming using COBOL. Includes structured flow-charting and programming, basic concepts, COBOL divisions and verbs, multi-page reporting, report totals, and logical control breaks. Students prepare and test several programs using the University computer system.

MIS 4222 COBOL Programming 2 (3 q.h.)
Continuation of MIS 4221. Includes table handling, (subscripting and indexing), internal sort concepts, (using, giving, input and output procedures), mass storage concepts (access methods, index file processing, random, and dynamic), and sequential and random file updating. Students prepare and test several programs using the University computer system. *Prereq.* MIS 4221.

MIS 4230 PC Software for Professionals (formerly End User Software) (3 q.h.)
Study of the large and rapidly growing collection of software geared toward the needs of the nontechnical end user. Includes discussion of various software packages such as spreadsheets, databases, and graphics. *Not open to students who have taken MIS 4102 since Fall 1992.*

MIS 4231 COBOL Intensive A (6 q.h.)
Same as MIS 4221 and MIS 4222.

MIS 4235 Advanced COBOL Programming (3 q.h.)
Several advanced programming disciplines and techniques for the COBOL programmer. Includes string and unstring, cell subroutines, multi-dimension tables, advanced index file processing, debugging techniques,

and communications. Students work on major business projects, prepare and test several programs using the University computer system.

MIS 4236 Advanced PC Software (3 q.h.)
Advanced skills in spreadsheets, graphics, database, and advanced commands in PC/MS-DOS. Includes lectures, in-class demonstrations, and extensive assignments that apply skills. Not for the first-time personal computer user. *Prereq.* MIS 4102 or equivalent.

MIS 4241 Programming in BASIC 1 (3 q.h.)
Introduction to computer programming using BASIC. Includes arithmetic operators, variables, expressions, arrays, functions, and formatted printing. Students write, debug, and run a number of programs on the computer. *Prereq.* MIS 4102.

MIS 4242 Programming in BASIC 2 (3 q.h.)
Continuation of MIS 4241. Covers more sophisticated BASIC programming techniques. Includes subroutines, nested loops, sorting, and file handling. Students write, debug, and run a number of programs on the computer. *Prereq.* MIS 4241.

MIS 4273 PC DOS (3 q.h.)
Introduction to the Disk Operating System (DOS), a collection of programs that manages the activities among personal computer components. Students have the opportunity to write one or more DOS batch routines. *Prereq.* MIS 4102.

MIS 4276 Programming in C 1 (3 q.h.)
Fundamentals of the C programming language, I/O operations, arithmetic operations, loops, arrays, character strings, functions. Structures, file organization (textfiles, random access files). Pointers, queues, stacks, rings, binary trees. *Prereq.* knowledge of at least one other programming language.

MIS 4277 Programming in C 2 (3 q.h.)
Advanced programming techniques using C, recursion, address arithmetic, the preprocessor, pointers vs. multidimensional arrays, pointers to functions, macros, nested structures, unions, file merging and sorting techniques, linked lists, command line arguments, binary trees, operations on bits, enumerated data types. *Prereq.* MIS 4276.

MIS 4278 Programming in C 3 (3 q.h.)
This is the third course in the C Language series. Covers advanced techniques using C

and C++ programming language in a business-oriented environment. Ordered lists, queues, stacks, trees, multinode trees, relational databases, Qsort and research techniques are some of the topics. The use of C++ advanced functions are described by class lecture and reinforced by lab work. *Prereq.* MIS 4277.

MIS 4279 Programming in C1 and C2 Intensive (6 q.h.)
Same as MIS 4276 and MIS 4277.

MIS 4282 Operating Systems Overview (3 q.h.)
Designed to introduce the student to the most frequently used operating systems—UNIX, PC-DOS, and MS WINDOWS. Through class lectures, reading assignments, and hands-on lab exercises, the student will examine the overall structure, genealogy, and basic commands of the three systems.

MIS 4283 Introduction to Windows Programming (3 q.h.)
Introduction to programming for the Microsoft Windows graphic environment using the C language. Covers Windows programming topics such as bitmaps, menus, icons, and dialog boxes, memory management, printing and Dynamic Link Libraries. Intended for those seeking a working knowledge of basic Windows programming techniques.

MIS 4301 Structured Systems Analysis and Design 1 (3 q.h.)
Systems analysis and design cycle, with emphasis on the analysis phase. Includes the history and life-cycle of business information systems, the role of the systems analyst, analytical tools useful to the systems study process, development of feasibility studies, and presentation of study phase findings. *Prereq.* MIS 4102.

MIS 4302 Structured Systems Analysis and Design 2 (3 q.h.)
Continuation of MIS 4301. Emphasizes the design phase and systems implementation. Includes detailed systems design procedures and techniques, system testing, specification and procedure writing, documentation, design of auditing and control procedures, performance measurement techniques, hardware and software selection and planning, and project management. *Prereq.* MIS 4301 or MIS 4401.

MIS 4305 Structured Systems Analysis and Design (Intensive) (6 q.h.)
Same as MIS 4301 and MIS 4302.

MIS 4307 Communications and Networking (3 q.h.)

Communications, networking, and distributed processing from the user's rather than the designer's point of view. Includes the economics of distributed processing, communications concepts, local-area networks, and vendor selection. *Prereq.* MIS 4302 or MIS 4402.

MIS 4320 VAX Overview (3 q.h.)

Introduces the student to the hardware and software of digital vax network. Logging on, use of a password, manipulating files, using text editor for programming, compiling simple programs and flowcharting a program flow are covered. Electronic mail is used to communicate on the network.

MIS 4321 UNIX for C Programmers (3 q.h.)

Designed to provide "C" programming students with an understanding of the UNIX operating system. Through reading assignments, lectures, and lab exercises, the student will focus on the following topics: files, text manipulation, editors, programming tools in System V, and systems management. *Prereq.* MIS 4282 and MIS 4276.

MIS 4322 UNIX Shell Programming (3 q.h.)

This course covers the UNIX Shell as a programming language. Topics include: login profile, loops and program control, testing shell programs, true and false commands, case statements, and shell functions. *Prereq.* MIS 4321.

MIS 4342 Advanced Database (3 q.h.)

This is the second step in the database path. The focus is on a major database programming language, other database programming tools, advanced database techniques and how database interfaces with other software. *Prereq.* MIS 4236.

MIS 4343 FoxPro Database (3 q.h.)

This is the third step in the Database path. Using FoxPro to create application programs is covered along with all the development tools available with FoxPro. This is an intensive course in the use of the FoxPro software. *Prereq.* MIS 4342.

MIS 4344 Business Presentation Graphics (3 q.h.)

Students can learn how to create computerized presentation graphics using Harvard Graphics software. The basics of Harvard Graphics are covered along with text, bar/line, area, pie, and organization charts. The draw/annotate feature is explored.

MIS 4350 Auditing Data Processing (3 q.h.)

EDP audit techniques, programming, and operations, emphasizing EDP standard practices, procedures, documentation, and safety and security. Defines EDP business risks and related exposures, such as fraud, embezzlement, misuse or destruction of company assets, and business interruption. Offers discussion of the EDP portion of accounting requirements of the Foreign Corrupt Practices Act of 1977. Course content is oriented toward EDP managers, internal auditors, and public accountants. *Prereq.* MIS 4102.

MIS 4360 Computer Privacy and Security (3 q.h.)

Threats posed by and to modern electronic computers and their users. Includes a review of the issue of privacy and approaches, techniques, and tools used to safeguard computers. Uses actual case studies of computer abuse. *Prereq.* MIS 4102.

MIS 4401 Structured Systems Analysis and Design 1 (Reserved) (3 q.h.)

Systems analysis and design cycle, with emphasis on the analysis phase. Includes the history and life-cycle of business information systems, the role of the systems analyst, analytical tools useful to the systems study process, development of feasibility studies, and presentation of study phase findings. *Prereq.* MIS 4102 and 80 q.h.

MIS 4402 Structured Systems Analysis and Design 2 (Reserved) (3 q.h.)

Continuation of MIS 4401. Emphasizes the design phase and systems implementation. Includes detailed systems design procedures and techniques, system testing, specification and procedure writing, documentation, design of auditing and control procedures, performance measurement techniques, hardware and software selection and planning, and project management. *Prereq.* MIS 4401 or MIS 4301 and 80 q.h.

MIS 4405 Structured Systems Analysis and Design Intensive (Reserved) (6 q.h.)
Same as MIS 4401 and MIS 4402.

MIS 4407 Communications and Networking (Reserved) (3 q.h.)
Communications, networking, and distributed processing from the user's rather than the designer's point of view. Includes the economics of distributed processing, communications concepts, local-area networks, and vendor selection. *Prereq.* MIS 4402 or MIS 4302 and 80 q.h.

MIS 4445 DataBase Management Systems (Reserved) (3 q.h.)
Introduction to the database approach to design of integrated information applications. Covers the three methods of database design; data structures; diagramming; data definition languages; data manipulation languages; database implementation and evaluation; and the role of the database administrator. *Prereq.* MIS 4222, MIS 4230, and MIS 4302 and 80 q.h. or MIS 4402.

MIS 4446 Information Systems for Management (Reserved) (3 q.h.)
Students learn how information technology (IT) supports corporate goals. Emphasis is on the management of IT rather than on computer technology or programming. Readings and case studies will illustrate how IT may be employed to support general management functions. Issues such as the types of information systems, the impact of information systems on individuals and organizations, outsourcing, and the use of IT as a weapon of competitive strategy will be discussed along with technological issues such as database management systems, electronic data interchange, decision support systems, and expert systems. *Prereq.* MIS 4102 or MIS 4103. (Not open to students who have taken MIS 4448.)

MIS 4485 Applied MIS Development Project (Reserved) (3 q.h.)
Capstone systems course integrates knowledge and abilities gained through other computer-related courses in the curriculum, within a comprehensive systems development project. The student has a choice of two options. Option I is a systems analysis and system design of a small system which is usually personal computer-based. This includes the topics covered in MIS 4401 and MIS 4402 and requires the programming of

two or three programs from the system designed. The final product is a complete system with operational programs. Option II is a detailed research project. The topic is selected by the student, approved and the scope defined by the instructor. The final product is a paper which covers the selected topic from various viewpoints. *Prereq.* MIS 4448.

MIS 4600 Honors Program 1 (4 q.h.)
Opportunity to undertake an in-depth research study project. See page 24 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

MIS 4601 Honors Program 2 (4 q.h.)
See MIS 4600.

MIS 4602 Honors Program 3 (4 q.h.)
See MIS 4600.

MIS 4701 Independent Study 1 (3 q.h.)
Opportunity to undertake special research. See page 24 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

MIS 4702 Independent Study 2 (3 q.h.)
See MIS 4701.

MIS 4703 Independent Study 3 (3 q.h.)
See MIS 4701.

MIS 4800 Advanced Tutorial 1 (3 q.h.)
Opportunity to take upper-level course independently. See page 23 for details. *Prereq.* 87 q.h.

MIS 4801 Advanced Tutorial 2 (3 q.h.)
See MIS 4800.

MARKETING

MKT 4301 Introduction to Marketing 1 (3 q.h.)
This course consists of lectures, readings and small group discussions on the role of marketing in contemporary society, in the business enterprise, and in the nonprofit organization. Consideration is given to the planning, operation, and evaluation of marketing and promotional efforts necessary to the effective marketing of consumer and industrial products and services in both profit and nonprofit organizations.

MKT 4302 Introduction to Marketing 2 (3 q.h.)
Continuation of MKT 4301. Develops the link between marketing theory and practice. Covers specific marketing issues and problems. Includes case study analysis and current marketing issues. *Prereq.* MKT 4301.

MKT 4304 Introduction to Marketing (Intensive) (6 q.h.)

Same as MKT 4301 and MKT 4302.

MKT 4308 Direct Response Marketing (3 q.h.)

Direct response marketing communicates directly with the prospective customer to create an immediate response. Topics include management of direct response programs in telemarketing, mail, catalog and print/broadcast media settings. Applications in consumer, business-to-business and non-profit areas are also discussed.

MKT 4310 Advertising Management 1 (3 q.h.)

This course focuses on the management of the advertising function in relation to a firm's overall marketing objectives. The course approaches the subject from the perspective of the user of advertising (e.g., product manager, marketing manager). Case studies and text material are used to help the student develop decision-making skills. *Prereq.* MKT 4320.

MKT 4315 Sales Management 1 (3 q.h.)

Allows student to develop effective selling skills. Examines the customer buying process and the company sales process. Discusses prospecting, preparation, presentation, and post-sale activities and introduces advanced selling techniques, such as team selling. Focuses on situations where personal selling is a major element of marketing strategy, such as industrial-product, professional-service, and high-technology marketing. *Prereq.* MKT 4320.

MKT 4320 Marketing Management (3 q.h.)

This course is designed to provide training in marketing decision-making. Case studies simulating actual business settings are used to help students develop analytical abilities and sharpen their communication skills. Topics covered ranged from techniques used to analyze a market to the development of a total marketing strategy (product policy, pricing policy, promotion policy, and distribution policy). *Prereq.* MKT 4301.

MKT 4335 Public Relations 1 (3 q.h.)

Introduction to the basic principles, purposes, and practices of public relations in both commercial and nonprofit organizations. Emphasizes organization, research, and writing fundamentals.

MKT 4336 Public Relations 2 (3 q.h.)

Continuation of MKT 4335. Emphasizes the development of public relations programs for specific publics. *Prereq.* MKT 4335.

MKT 4340 Retail Management 1 (3 q.h.)

Concepts and techniques of store operations and merchandise management. Focuses on the activities and contributions of various retailing institutions, such as independents, chains, dealerships, specialty stores, supermarkets, discount stores, and franchises. Also includes retail management, retail profit and loss, starting a retail business, store location, store planning, and the retail organization. *Prereq.* MKT 4301.

MKT 4341 Retail Management 2 (3 q.h.)

Continuation of MKT 4340. Emphasizes store operations; merchandising planning, control, and management; pricing; buying; sales promotion; customer service; retail accounting; and expense management. *Prereq.* MKT 4340.

MKT 4411 Advertising Management 2 (Reserved) (3 q.h.)

Continuation of MKT 4410. Surveys why and how advertising works, and includes challenging and practical case studies. *Prereq.* MKT 4420 or MKT 4320 and 80 q.h.

MKT 4416 Sales Management 2 (Reserved) (3 q.h.)

This course is designed to help the student develop decision-making skills necessary for both building and maintaining an effective sales organization. Cases and readings are used to examine the strategic and operating problems of the sales manager. Major topic areas include the selling function, sales management at the field level, and the sales executive. *Prereq.* MKT 4415 or MKT 4315 and 80 q.h.

MKT 4430 Marketing Research 1 (Reserved) (3 q.h.)

Course focuses on providing students with an introduction to the field of marketing research from a user's point of view. Topics include problem definition, research objectives, research applications, information sources, and a discussion and evaluation of alternative methods for collecting data. *Prereq.* MKT 4420 or MKT 4320 and 80 q.h.

MKT 4431 Marketing Research 2 (Reserved) (3 q.h.)

Course focuses on the techniques and procedures required to conduct high quality re-

search studies. Topics include sampling techniques, questionnaire development, data collection methods, survey errors, and processing and analyzing research data. Course is taught from the viewpoint of the person who conducts market research studies. *Prereq.* 4430 or MKT 4330 and 80 q.h.

MKT 4453 International Marketing (Reserved) (3 q.h.)

This course is designed to help familiarize the student with those aspects of marketing that are unique to international business within the framework of traditional functional areas of marketing. The focus is on the environment and the modifications of marketing concepts and practices necessitated by environmental differences. Topics include cultural dynamics in international markets, political and legal environmental constraints, educational and economic constraints, international marketing research, international marketing institutions, and marketing practices abroad. *Prereq.* MKT 4420 or MKT 4320 and 80 q.h.

MKT 4457 Competitive Strategy (Reserved) (3 q.h.)

A capstone marketing course, required of all students with a marketing concentration. The focus is on the formulation of marketing strategy at a policy level and its implementation in a dynamic environment. *Prereq.* MKT 4420 or MKT 4320 and 80 q.h.

MEDICAL LABORATORY SCIENCE

MLS 4104 Introduction to Phlebotomy (4 q.h.) (Offered Winter and Summer Quarters.)

This course emphasizes the role of the phlebotomist as part of the health care team. Topics will include proper patient identification, patient relationship, equipment, venipuncture procedure, anatomy and physiology, terminology and pertinent others.

MLS 4108 Phlebotomy Applied Study (2 q.h.) (Offered Fall and Spring Quarters.)

This course develops the confidence and experience needed to become an expert phlebotomist. Varieties of venipunctures will be performed under the supervision of clinical instructors in an affiliated clinical site. *Prereq.* MLS 4104.

MLS 4301 Medical Laboratory Science Orientation* (2 q.h.)

Scope, responsibilities, opportunities, and educational requirements for the medical laboratory science professions. Medical terminology and laboratory mathematics are included.

MLS 4321 Hematology (3 q.h.)**

Basic hematological techniques, including discussion of the differential smear and observation of the normal morphology of human red cells, white cells, and platelets. (*Laboratory fee.*) *Prereq.* BIO 4105 or equiv. Not open to medical technology majors.

MLS 4322 Morphologic Hematology 1† (3 q.h.)

Morphologic and etiologic classification of the anemias. Related diagnostic tests are discussed. (*Laboratory fee.*) *Prereq.* MLS 4321 or equiv.

MLS 4323 Morphologic Hematology 2† (3 q.h.)

Studies of pathologic and physiologic deviations of the white cells series as observed in leukemias and infections. Some animal hematology is included. (*Laboratory fee.*) *Prereq.* MLS 4322 or equiv.

MLS 4341 Epidemiology 1 (3 q.h.)

Basic concepts in epidemiology, the distribution in determinants of diseases and injuries in human populations. Descriptive and analytical epidemiology studies are included.

MLS 4342 Epidemiology 2 (3 q.h.)

Microbiological distributions in determinants of infectious diseases; hospital epidemiology. May be taken independently of Epidemiology 1.

MLS 4352 Basic MLS Electronics and Instrumentation (2 q.h.)

Electricity, with coverage of introductory electronic circuits. Emphasizes medical laboratory instrumentation and related electrical processes of measurement.

MLS 4365 Quality Control (3 q.h.)

Development of quality control programs in each medical laboratory specialty. Includes applications of statistical methods to medical laboratory quality control programs.

*Offered Fall 1993.

**Next offered Fall 1994.

†Follows MLS 4321 in Winter and Spring Quarters respectively.

MLS 4381 Seminar in Medical Technology (3 q.h.)

Current topics in medical technology. Includes required readings and presentations by students; guest lecturers. *Prereq. instructor's permission.*

MLS 4700 Advanced Tutorial 1 (3 q.h.)

Opportunity to take upper-level course independently. See page 23 for details. *Prereq. 87 q.h.*

MLS 4701 Advanced Tutorial 2 (3 q.h.)

See MLS 4700.

MANAGEMENT SCIENCE

MS 4325 Business Decision Models

(formerly Introduction to Modeling and Simulation) (3 q.h.)

Modeling as a method for gaining insight into the underlying mathematical structure of business problems. Discusses specific modeling techniques, such as linear programming and simulation. *Prereq. MTH 4111 and ECN 4251.*

MS 4332 Statistical Quality Control (3 q.h.)

Practical course designed to introduce the student to the basics of statistical process control (SPC) and acceptance sampling used in quality control and quality assurance of products or services. Includes control charts for attributes and variables data, process capability analysis, statistical tolerancing, and acceptance sampling concepts and sampling plans for attributes. *Prereq. ECN 4251.*

MS 4334 Advanced Statistical Quality Control (formerly Advanced Quality Control) (3 q.h.)

Continuation of MS 4332. Includes the use of computers in process control and acceptance sampling; special process control charts and acceptance sampling procedures; process capability and tolerance analysis; graphical problem-solving tools for quality improvement; life testing and reliability concepts.

MATH

MTH 4100 Conquering Math 1 (Noncredit)

Designed for those persons with anxiety about using math, or who have had minimal exposure to it. The course includes an explanation of numbers and arithmetic operation such as addition, subtraction, multiplication,

and division; numbers and their groupings: prime numbers, number systems, and parentheses; measure: English and Metric conversions; the real number line, signed numbers, and absolute values; number notation, such as fractions. All concepts are presented using arithmetic and many examples.

MTH 4101 Conquering Math 2 (Noncredit)

The course is a follow-on of MTH 4100. Topics include number displays: linear and circular; the three dimensions; exponents and radicals; averages, percents; number displays: slopes and rates, sequences and series; and many well-explained word problems. All concepts are presented using arithmetic, many examples, and a few simple formulas.

MTH 4001 Introduction to Mathematics 1 (3 q.h.)

Review of elementary algebra, including operations on integers, algebraic expressions, exponents, equations, word problems, and graphing. *Credit for this course cannot be applied to School of Engineering Technology degree programs.*

MTH 4002 Introduction to Mathematics 2 (3 q.h.)

Further review of mathematics, including operations with polynomials, factoring, fractional expressions, and radicals. *Credit for this course cannot be applied to School of Engineering Technology degree programs. Prereq. MTH 4001.*

MTH 4006 Technical Mathematics* (4 q.h.)

Reviews high school algebra equations, formulas, exponents, polynomials, factoring, scientific notation, fractions, radicals, quadratic equations, and linear equations and their applications. *Credit cannot be used in the associate in engineering, associate in science, or the bachelor of engineering technology degree programs.*

MTH 4107 College Algebra* (4 q.h.)

Diagnostic exam to insure proper placement of students. Interval notation, integer and rational exponents, factoring, operations with fractional expressions, operations with radicals and complex numbers, Pythagorean theorem, linear and quadratic equations and inequalities, distance and midpoint formulas, functional notation, graphing of func-

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tions including straight lines, absolute values, polynomials, exponential and logarithmic, solving equations involving radicals; solving polynomial, exponential and logarithmic equations. Use of scientific calculator. *Prereq.* Math diagnostic exam or MTH 4006 or equiv.

MTH 4108 Pre-Calculus* (4 q.h.)

Topics include trigonometric functions of angles in degrees and radians; trigonometric identities and equations; right triangles; law of sines and cosines; inverse trigonometric functions; polar coordinates; complex numbers in trigonometric form; systems of linear and nonlinear equations; determinants; binomial theorem; arithmetic and geometric sequences and series; and conic sections. *Prereq.* MTH 4107.

MTH 4110 Contemporary Algebra 1
(formerly Math 1) (3 q.h.)

Real numbers, first-degree equations and inequalities, polynomials, and rational expressions. *Prereq.* one year of high school algebra or its equiv. A placement test is given during the first class meeting. Students who do not attain a qualifying score on this test are advised to enroll in MTH 4001, Introduction to Mathematics, for additional preparation. Credit for this course cannot be applied to School of Engineering Technology degree programs.

MTH 4111 Contemporary Algebra 2
(formerly Math 2) (3 q.h.)

Exponents and radicals, linear equations in two variables, quadratic equations, functions and relations, conic sections, systems of equations and inequalities, sequences and series. Credit for this course cannot be applied to School of Engineering Technology Degree programs. *Prereq.* MTH 4110 or equiv.

MTH 4112 Contemporary Algebra 3
(formerly Math 3) (3 q.h.)

Study of complex numbers; standard form of equation for circle, ellipse, and hyperbola; and exponential and logarithmic functions. Introduction to calculus including functions and their graphs, limits, average rate of change, derivative of a function and the rules of differentiation, maxima and minima, and optimization. *Prereq.* MTH 4111 or equiv. Credit for this course cannot be applied to School of Engineering Technology Degree programs.

MTH 4113 Contemporary Algebra
(Intensive) (formerly Mathematics Intensive) (9 q.h.)

Same as MTH 4110, MTH 4111, and MTH 4112.

MTH 4114 Contemporary Algebra 1 and 2
Combination (formerly Mathematics 1 and 2 Combination) (6 q.h.)

Same as MTH 4110 and MTH 4111.

MTH 4120 Calculus 1* (4 q.h.)

Topics include plane analytic geometry of the line and circle; review of inequalities and general function operations; theory and evaluation of limits; derivatives of algebraic and trigonometric functions; general rules of differentiation; Rolle's theorem, mean value theorem; applications of differentiation including velocity, acceleration, related rates, maximum, minimum, curve sketching, and approximations by differentials. Solving the equation $f(x) = 0$ by applying Newton's Method. *Prereq.* MTH 4108.

MTH 4121 Calculus 2* (4 q.h.)

Examines antiderivative and development of the fundamental theorem with applications to areas, volumes, and rectilinear motion problems. Topics include the logarithmic exponential, and inverse trigonometric functions and their applications; techniques of integration including parts, partial fractions, substitution, and the use of tables, numerical integration (Simpson's and Trapezoidal Rule); L'Hospital's Rule; improper integrals, and the geometry of vectors in a plane and space. *Prereq.* MTH 4120.*

MTH 4122 Calculus 3* (4 q.h.)

Studies three-dimensional space and a treatment of functions of several variables; multiple integrals with applications in areas and volumes; sequences and series; differential equations, including the solution with applications of first-order with variables separable, first-order linear, and second-order linear homogeneous to complete the sequence. *Prereq.* MTH 4121.*

MTH 4123 Differential Equations* (4 q.h.)

Linear differential equations with constant coefficients, homogeneous and non-homogeneous, are examined. Explores the variation of parameters and undetermined coefficient

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cients and simultaneous differential equations, the Laplace transform, series solution of differential equations, and the Fourier series. Orthogonal functions and numerical solutions of differential equations are studied. *Prereq.* MTH 4122.*

MTH 4130 Fundamentals of Calculus 1
(3 q.h.)

Introductory course intended for students in liberal arts, business administration, and other nonengineering curricula. Includes fundamentals of differential calculus, rules of differentiation, rates of change, graph sketching, and growth and decay function. *Credit for this course cannot be applied to School of Engineering Technology degree programs.* *Prereq.* MTH 4112 or equiv.

MTH 4131 Fundamentals of Calculus 2
(3 q.h.)

Applications of differential calculus, including problems in optimization, velocity and acceleration, compound interest, population growth, and the fitting of equations to data. Introduces integral calculus, areas, average values of functions, marginal cost and profit, and depreciation. *Credit for this course cannot be applied to School of Engineering Technology degree programs.* *Prereq.* MTH 4130 or equiv.

MTH 4132 Fundamentals of Calculus 3
(3 q.h.)

Calculus of trigonometric functions, techniques of integration, numerical methods, and differential equations. Applications include pricing, allocation of funds, present value of an investment, manufacturing efficiency, and product reliability. *Credit for this course cannot be applied to School of Engineering Technology degree programs.* *Prereq.* MTH 4131 or equiv.

MTH 4140 Mathematics for Business Management 1 (3 q.h.)

Mathematics topics applicable to business management, such as linear equations and inequalities, matrix algebra, linear programming, sets, and counting techniques. *Prereq.* MTH 4112 or equiv.

MTH 4141 Mathematics for Business Management 2 (3 q.h.)

Business applications of probability, decision theory, Markov chains, game theory, and competitive analysis. *Prereq.* MTH 4140.

MTH 4143 Mathematics for Business Management (Intensive) (6 q.h.)
Same as MTH 4140 and MTH 4141.

MTH 4520 Statistically Thinking (3 q.h.)

Introduction to statistical mode of thinking. Presents the essential logic of statistical analysis to allow the student to critically evaluate research published in professional journals as well as newspapers. The process of collecting, analyzing, and interpreting data is discussed, as well as the use of computers in statistical analysis. Lectures used in conjunction with discussions of outside readings to illustrate concepts.

MTH 4700 Advanced Tutorial 1 (3 q.h.)

Opportunity to take upper-level course independently. See page 23 for details. *Prereq.* 87 q.h.

MTH 4701 Advanced Tutorial 2 (3 q.h.)

See MTH 4700.

MUSIC

MUS 4100 Introduction to Music (3 q.h.)

The study of music as a major creative force and component of human civilizations in all parts of the globe. This survey course emphasizes the development of listening skills as well as an appreciation of musical forms within historical and cultural contexts.

MUS 4110 Music in Popular Culture (3 q.h.)

Investigation of American attitudes toward culture, art, and beauty through consideration of contemporary popular music. Compares the different styles of pop music (jazz, rock, MOR, and R&B) and traces their evolution. Examines the manipulation of public tastes by large corporations for commercial purposes.

MUS 4111 Rock Music (3 q.h.)

History of rock music from its origins in American blues and other styles through the popular music of the 1950s, the political styles of the 1960s, and the diverse trends of the 1970s. Emphasizes the formative years of rock.

MUS 4112 Jazz (3 q.h.)

Jazz, from its origins in New Orleans to the avant-garde experiments of today. Includes analysis of the rhythmic, harmonic, instrumental, and stylistic characteristics of jazz.

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Covers the works of such creative jazz artists as Armstrong, Beiderbecke, Parker, Ellington, and Coltrane.

MUS 4120 Music Appreciation: The Masterworks of Western Civilization (formerly History of Musical Styles) (3 q.h.) Selected masterworks of the Euro-American traditions will be studied in a chronological survey. This course emphasizes the development of listening skills as well as an appreciation of musical forms within historical and cultural contexts. Composers to be studied include Bach, Handel, Mozart, Beethoven, Brahms, Wagner, Mahler, and Stravinsky.

MUS 4121 Medieval and Renaissance Music (3 q.h.) Development of sacred and secular monophony, vocal and instrumental works, and polyphonic music from their beginnings to about 1600.

MUS 4122 Music of the Baroque (3 q.h.) The period of the emergence of the orchestra, the chorus, and the virtuoso performer and the development of the oratorio, opera, concerto, and symphony in the works of Monteverdi, Corelli, Vivaldi, Handel, and J. S. Bach.

MUS 4123 Music History of the Classical Period (3 q.h.) Study of changing musical styles from Stamitz and the Mannheim School through the works of Haydn, Mozart, and early Beethoven.

MUS 4124 Music History of the Romantic Era (3 q.h.) Musical styles of the nineteenth century, including the role of music and the musician in the changing social, economic, political, and cultural structure of Europe. Analyzes music by Beethoven, Schubert, Berlioz, Brahms, Verdi, and Wagner.

MUS 4125 Music History of the Twentieth Century (3 q.h.) The diversity of styles from Debussy through Stravinsky, Schoenberg, Bartok, and Hindemith and more recent developments, including *musique concrete*, chance music, and electronic music.

MUS 4130 The Symphony (3 q.h.) The symphony as the major genre in the Classical, Romantic, and contemporary periods. Covers works by Haydn, Mozart,

Beethoven, Schumann, Tchaikovsky, Brahms, and Sibelius.

MUS 4140 Life and Works of Mozart (3 q.h.) Mozart's musical development from child prodigy to mature artist, traced from his own letters and from biographies. Includes analysis of many of his major works, including operas, symphonies, concertos, and chamber music.

MUS 4141 Life and Works of J. S. Bach (3 q.h.) The genius who summed up the Baroque era and whose every note reflected his profoundly humanistic approach to religion. Works examined include large choral masterpieces, such as the *St. Matthew Passion*, the *Brandenburg Concertos*, the *Well-Tempered Clavier*, and the *Suites*.

MUS 4144 Life and Works of Debussy (3 q.h.) Debussy's impressionist music as the turning point toward modern trends. Studies much of his work for piano, orchestra, and opera, including *Suite pour le Piano*, *Suite Bergamasque* ("Clair de Lune"), *Images* for piano and orchestra, *Nocturnes*, *La Mer*, and the opera *Pelleas and Melisande*.

MUS 4145 Life and Works of Beethoven (3 q.h.) The complex personality and art of this figure, including his relation to the turbulent times in which he lived and his role in Classical and Romantic music.

MUS 4163 Sound Health: Music and Relaxation 1 (3 q.h.) Opportunity to experience a heightened awareness of the power of music to effect physical and emotional change, and to examine the effects of music on the body, mind, and spirit. An exploration into the awareness of sound and the physiological changes caused by music. Covers theories and techniques used to facilitate positive change, relaxation, and reduction of stress. Includes sound pollution, the effects of vibrations on the body, guided imagery, music and meditation, and New Age and environmental music.

MUS 4164 Sound Health: Music and Relaxation 2 (3 q.h.) This course allows each student to strengthen his/her ability to work with specific techniques for using music to facilitate relaxation, stress reduction and inner healing for personal use or in a health care setting. Em-

phasis will be on creating healing imagery, choosing appropriate music and vocal techniques. *Prereq.* MUS 4163.

MUS 4165 The Music Industry (3 q.h.)

Business-related areas of the music industry. Addresses the structure of the record industry and music publishing world, the function of performing rights organizations (ASCAP and BMI), and the role of concert and orchestral managers. Features guest lecturers from various fields and trips to "behind-the-scenes" locations.

MUS 4168 Building a Career in Musical Performance (3 q.h.)

Designed for performers representing themselves or for those interested in managing other artists. Topics include auditions, job investigation, resumes, photographs, press-kits, recording, and debut recitals. Students assemble press kits, write press releases and PSAs, and learn effective ways to garner and handle publicity, to differentiate among the various audio and video formats, and assay their ideas on novel methods of promoting themselves or others.

MUS 4171 Computers and Music (3 q.h.)

History of the use of computers for music composition, music and sound analysis, sound sampling and synthesis, and music scoring and printing. Emphasizes the latest technology, including the use of MIDI (Musical Instrument Digital Interface). Also features hands-on use of computers, music software, and synthesizers.

MUS 4172 The Recording Studio (3 q.h.)

The history and methods of audio reproduction from Edison's gramophone to today's multi-track digital techniques. Includes instruction and hands-on experience at the recording facility in the College's new Media Studio. Guest lectures from experts in the field and visit to a local professional studio. (*Additional fee required for studio work.*)

MUS 4180 Introduction to World Music (3 q.h.)

The varied musical cultures of non-Western societies. Exploration of characteristics common to all musical systems, followed by investigation of music in the Middle East, southern and eastern Asia, Africa, South and Central America, and the Caribbean.

MUS 4200 How to Read and Write Music (3 q.h.)

Basics of musical notation for students with

little or no theory or performance background. Focuses on the use of the symbols of pitch and duration. Includes sight reading simple melodies, following scores, arranging music for small instrumental groups, transposition, and elementary rhythmic and melodic composition.

MUS 4201 Music Theory 1 (4 q.h.)

Basics of music theory as a foundation for further musical study and activity. Begins with aural and visual identification of pitches, intervals, major and minor scales, and triads in the G and F clefs. Includes rhythmic and simple melodic dictation, sight-reading, elementary melodic writing, and chord construction.

MUS 4202 Music Theory 2 (4 q.h.)

Visual identification of pitches in the soprano, alto, and tenor clefs; transposition; some elementary arranging; writing and aural identification of cadences; elementary musical analysis; melodic and rhythmic dictation; and sight reading. *Prereq.* MUS 4201 or *equiv.*

MUS 4203 Music Theory 3 (4 q.h.)

Continuation of MUS 4202. Covers elementary four-part writing, introduction to figured bass, score reading, and harmonic analysis. Activities include harmonic as well as melodic dictation and part singing by sight. *Prereq.* MUS 4202.

MUS 4231 Musical Performance 1 (1 q.h.)

Participation in rehearsals and public performances and/or research; and composition, arranging, conducting, and solo and ensemble activity with the NU Symphony Orchestra, the Early Music Players, the NU Chorus, the NU Bands, or other ensembles under the supervision of a faculty member. Evaluation of student progress at the end of the quarter by audition or other method. *Prereq.* audition or instructor's permission.

MUS 4232 Musical Performance 2 (1 q.h.)

Continuation of MUS 4231. *Prereq.* MUS 4231.

MUS 4233 Musical Performance 3 (1 q.h.)

Continuation of MUS 4232. *Prereq.* MUS 4232.

MUS 4234 Musical Performance 4 (1 q.h.)

Continuation of MUS 4233. *Prereq.* MUS 4233.

MUS 4235 Chamber Music 1 (3 q.h.)

Ten sessions, at least one-half hour each, for rehearsal, study, and performance of music for two to six players (matched according to

level) under the guidance of a faculty coach. Repertoire selected from the full range of European concert music by the instructor in consultation with the students. For details, call 617-373-2416.

MUS 4236 Chamber Music 2 (3 q.h.)
Continuation of MUS 4235. *Prereq.* MUS 4235 or instructor's permission.

MUS 4237 Chamber Music 3 (3 q.h.)
Continuation of MUS 4236. *Prereq.* MUS 4236 or instructor's permission.

MUS 4241 Piano Class 1 (3 q.h.)
For beginning piano students who want to progress at their own pace. Grades are awarded after passing various step levels. Ownership of a piano is not required.

MUS 4242 Piano Class 2 (3 q.h.)
Introduction of scales, arpeggios, and triads to help students perform more advanced music. Repertoire consists of original compositions by the instructor and simple works by Bartok and Kabalevsky. *Prereq.* MUS 4241 or equiv., or instructor's permission.

MUS 4243 Piano Class 3 (3 q.h.)
Two-octave scales, arpeggios, and triads in all keys. Repertoire consists of Bartok, Kabalevsky, original compositions by the instructor, and duets specifically arranged for this course. *Prereq.* MUS 4242 or equiv., or instructor's permission.

MUS 4244 Voice Class (3 q.h.)
Basic vocal production required for fine singing. Repertoire, both classical and contemporary, is chosen for each student to learn and perform in lessons and outside of class. Includes lectures concerning diction, the physiology of singing, resonance, registers, interpretation, and the basics of music reading and sight-singing. Also includes class analysis of recordings of great vocal artists.

MUS 4247 Guitar Class 1 (3 q.h.)
Intended for beginners. Covers basic classical guitar techniques, including proper sitting and hand positions, note reading, and ensemble playing. Instruments, preferably nylon-strung, are required.

MUS 4248 Guitar Class 2 (3 q.h.)
Intended for those who have taken MUS 4247 or who already have a basic knowledge of classical guitar techniques and note reading. Introduces both solo and ensemble repertoire suitable to the advanced beginner. *Prereq.* MUS 4247 or instructor's permission.

MUS 4249 Guitar Class 3 (3 q.h.)
Continuation of MUS 4248, with repertoire suitable for early intermediate students. *Prereq.* MUS 4248 or instructor's permission.

MUS 4261 Music Instruction (1 q.h.)
Individual instruction in a musical instrument or in voice. Lessons may be arranged on a 45-minute basis. Call 617-373-2416 for details. *Special fees.* May be repeated for credit.

MUS 4270 Synthesizer Class (3 q.h.)
Intended for beginners. Covers basic keyboard techniques and music-reading skills, as well as utilization of the special features of some of the more popular digital synthesizers.

MUS 4301 Form and Analysis (3 q.h.)
The principles of unity and variety in musical composition. Representative works from all periods of Western music are used to analyze and study such single-member forms as theme and variation, rondo, minuet and trio, sonata-allegro, passacaglia, canon, and fugue. *Prereq.* MUS 4203 or equiv.

MUS 4541 Master Class 1 (3 q.h.)
Advanced instruction in a musical instrument or in voice given by a leading expert in the field. Students perform selected repertoire in class under the guidance of the "master" who uses the students' performances as a springboard for an illustrated discussion of performance practice and techniques. For details contact the Department of Music, 351 Ryder Hall, 617-373-2440. *Prereq.* audition or instructor's permission.

MUS 4542 Master Class 2 (3 q.h.)
Continuation of MUS 4541.

MUS 4543 Master Class 3 (3 q.h.)
Continuation of MUS 4542.

MUS 4810 Honors Program 1 (4 q.h.)
Opportunity to undertake an in-depth research study project. See page 24 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

MUS 4811 Honors Program 2 (4 q.h.)
See MUS 4810.

MUS 4812 Honors Program 3 (4 q.h.)
See MUS 4810.

MUS 4815 Advanced Tutorial 1 (3 q.h.)
Opportunity to take an upper-level course independently. See page 23 for details. *Prereq.* 87 q.h.

MUS 4816 Advanced Tutorial 2 (3 q.h.)
See MUS 4815.

MUS 4820 Independent Study 1 (3 q.h.)
Opportunity to undertake special research.
See page 24 for details. *Prereq.* 96 q.h., 3.0 q.p.a..

MUS 4821 Independent Study 2 (3 q.h.)
See MUS 4820.

MUS 4822 Independent Study 3 (3 q.h.)
See MUS 4820.

NURSING

NUR 4300 Nursing Transition (9 q.h.)
Introduces Registered Nurse students to the purposes, philosophy, and conceptual framework of the baccalaureate degree program. Provides opportunity to complement and validate knowledge of professional roles and role conflicts, communication and group process, and principles of teaching, learning, and evaluation. Uses the Roy Adaptation Model in designing and providing nursing care to aging, chronically ill, and dying patients. Discusses nutritional needs of aged, acute, and chronically ill individuals. Registration by petition to the Program Office. *Prereq.* BIO 4105, BIO 4177, BIO 4190, CHM 4113, PSY 4112, ENG 4112 and NUR 4302.

NUR 4302 Pharmacodynamics (3 q.h.)
Intended for Registered Nurses. Introduces pharmacology principles, the pharmacotherapeutics of drug groups, and individual drug substances of particular importance in the treatment and diagnosis of disease. *Prereq.* CHM 4113.

NUR 4303 Life Crisis: Analysis and Response (4 q.h.)
Considers personal, family, and community crises identified from literature, health agency clientele, and student sources. Uses concepts from nursing, sociology, anthropology, and social psychology to assess critically the individual's experience of crisis and the approaches used by providers in human-service systems to help people in crisis. Gives students in consumer and/or health and human service roles the opportunity to critically examine the meaning of life crises in a social-cultural vs. psychopathological framework and to explore principles and creative strategies that might be used in responding constructively to crises in their own lives or in their experience as health or human-service workers. *Open to all students.*

NUR 4402 Health Assessment (4 q.h.)
Provides the student with additional theory and skills relevant to the clinical decision-making role of the nurse as a primary care-taker. Extends the students' knowledge and experience of history-taking and physical and psychosocial assessment. Emphasizes analysis and synthesis of data obtained from a holistic health assessment as an essential framework for the identification of common health abnormalities and the enhancement of the nurse's clinical decision-making skills. *Open to any Registered Nurse.*

NUR 4500 Community Health Nursing (9 q.h.)
Focuses on the nursing process to promote adaptation of individuals, families, groups, and communities. Examines utilization of the Roy Adaptation Model in addressing client needs. Analyzes the interrelationship of client and environmental factors as they relate to the attainment of health goals. Discusses the influence of the role of the community health nurse and cultural, political, socioeconomic, and epidemiological factors on client adaptation. Registration by petition to the Program Office. Open only to matriculated BSN students. *Prereq.* NUR 4300, PSY 4242, and SOA 4102.

NUR 4502 Introduction to Nursing Research (4 q.h.)
Builds on students' prior exposure to selected studies applied to nursing. Discusses and critiques qualitative and quantitative research and the value of each to the practice of nursing and to the health-care field. Examines the importance of research in nursing to both practitioner and consumer. Registration by petition to the Program Office. *Prereq.* NUR 4300, SOA 4102, and PSY 4242.

NUR 4504 Contemporary Issues in Nursing (2 q.h.)
Analyzes sociological, political, legal, economic, ethical historical and ideological factors affecting contemporary nursing practice and the health care system. Synthesizes professional role issues. Registration by petition to the Program Office. *Prereq.* NUR 4300, SOC 4101, and PSY 4242. *Please note:* NUR 4504 and NUR 4505 replace NUR 4501 *Contemporary Nursing*.

NUR 4505 Introduction to Leadership and Management of Nursing Care (3 q.h.)
Concepts from nursing, organizational theory, decision-making theory and leader-

ship and management theory are explored to heighten the professional nurse's awareness of the complexity of human and material resources required for the delivery of nursing care to clients, and the importance of collaboration with a variety of providers. Registration by petition to the Program Office. *Please note: NUR 4504 and NUR 4505 replace NUR 4501 Contemporary Nursing.*

OPERATIONS MANAGEMENT

(formerly Industrial Management: IM)

OM 4301 Introduction to Operations Management (formerly IM 4301) (3 q.h.)
Concepts and principles related to the management of operation functions, taught from a management point of view. Relationships to other business functions. Operations, as a transformation process, with inputs of materials, investment, and people producing finished goods/services. Topics covered include product and process design, forecasting demand, capacity planning, facilities design, aggregate planning, scheduling, and quality control and assurance. *Prereq. MS 4325. Not open to students who have taken IM 4301 or IM 4401.*

OM 4302 Operations Analysis (formerly IM 4302) (3 q.h.)
Structuring problems and the application of analytical techniques in the development of solutions to operating systems problems. Topics covered include operations planning and scheduling, analyzing operating performance, quality issues, facilities layout, materials planning, and workforce planning. Examination of the operations audit as it relates to manufacturing and service organizations developed as a tool for operations analysis. *Prereq. OM 4401 or OM 4301 or OM 4404. Not open to students who have taken IM 4302.*

OM 4314 Productivity Enhancement and Quality (formerly IM 4314) (3 q.h.)
The fields of quality control and productivity as a body of managerial, technological, behavioral, and economic knowledge, together with the organized application of this knowledge to the practical improvement of operations. Introduction to various productivity improvement programs currently in use, including measurement and control; the relationship between increase in productiv-

ity and managing for higher quality. Reviews management practices of modern quality control and the different approaches to optimizing quality. Includes the economics of total quality, internal and external quality, and management of long-term quality and reliability. *Not open to students who have taken IM 4314.*

OM 4317 Purchasing and Materials Management (formerly IM 4317) (3 q.h.)
Development and analysis of factors considered in the acquisition process and subsequent management of the materials function. Examines the relationships among price, quality, and delivery performance. Topics covered include the make-or-buy decision, corporate purchasing strategies, setting customer service levels, inventory analysis, facility location, storage and material handling, and selection of the transportation mode. *Prereq. OM 4401 or OM 4301 or OM 4404. Not open to students who have taken IM 4317.*

OM 4321 Operations Planning and Control (formerly IM 4321) (3 q.h.)
The nature of control in general and the specific characteristics of management and operations control. Examines control structures, processes, and bases for design and implementation. *Prereq. OM 4401, OM 4301 or OM 4404. Not open to students who have taken IM 4321.*

OM 4326 Operations Management Policy (formerly IM 4326) (3 q.h.)
Analyses of complex operating situations faced by business managers. Students are exposed to integrative cases and are expected to identify problems in organizations, to develop viable courses of action, to conduct detailed analyses, and to identify a set of recommendations and an implementation strategy. *Prereq. OM 4314, OM 4317, OM 4321. Not open to students who have taken IM 4326.*

OM 4404 Service Operations Management (3 q.h.) (Reserved)
Operational issues confronting organizations competing in the service sector are discussed. Topics covered include service design, location, and layout. Other topics addressed are the capacity decision, aggregate planning, technology, scheduling, inventory issues, and the pursuit of quality (excellence). *Prereq. MS 4325 and 80 q.h.*

OM 4600 Honors Program 1 (formerly IM 4600) (4 q.h.)
Opportunity to undertake an in-depth research study project. See page 24 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

OM 4601 Honors Program 2 (formerly IM 4601) (4 q.h.)
See OM 4600.

OM 4602 Honors Program 3 (formerly IM 4602) (4 q.h.)
See OM 4600.

OM 4701 Independent Study 1 (formerly IM 4701) (3 q.h.)
Opportunity to undertake special research. See page 24 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

OM 4702 Independent Study 2 (formerly IM 4702) (3 q.h.)
See OM 4701.

OM 4703 Independent Study 3 (formerly IM 4703) (3 q.h.)
See OM 4701.

OM 4800 Advanced Tutorial 1 (formerly IM 4800) (3 q.h.)
Opportunity to take upper-level course independently. See page 23 for details. *Prereq.* 87 q.h.

OM 4801 Advanced Tutorial 2 (formerly IM 4801) (3 q.h.)
See OM 4800.

PHYSICAL EDUCATION

PED 4200 Cardiovascular Health and Exercise (3 q.h.)
Structured exercise program meeting three times per week and offering a choice of walking, jogging, swimming, or aerobic exercise classes and a weekly cardiovascular health lecture. Participants receive two comprehensive cardiovascular medical and physical fitness evaluations, prior to and at the completion of the program. Includes a cardiopulmonary examination by a cardiologist, blood chemistry profile, pulmonary function testing, resting EKG, graded exercise treadmill (stress) test with EKG and blood pressure evaluation, along with an assessment of percent body fat (ideal weight and projected weight loss where applicable). Each participant receives a computerized report; individual exercise programs are based on test results.

PHILOSOPHY

PHL 4100 Philosophical Thinking (3 q.h.)
Methods and values of thinking philosophically. Reveals strategies of dialogue and of informational discovery through understanding and use of the Socratic method of intellectual exchange. Analyzes the universal quest for truth in order to distinguish between knowing and not knowing, dogma, and ignorance. Proves value issues through questions in ethics and moral philosophy.

PHL 4102 Critical Thinking (3 q.h.)
This course will provide the student with several key skills: the organization and development of argument, analysis of content, and clear and precise articulation of ideas. Standard critical thinking texts will be coupled with texts from a variety of sources, ranging from newspaper articles to materials originating in the student's own field.

PHL 4105 Philosophy of Knowing and Reality (3 q.h.)
The difference between knowledge and belief. Areas of theoretical focus include the nature of ultimate reality, the nature of human knowledge, and the nature and existence of God. The investigation of a variety of problems and alternative solutions helps students think independently and self-critically. Emphasizes the development of discipline and precision in communicating ideas.

PHL 4110 Philosophy of Right and Justice (3 q.h.)
Ethics and social and political philosophy. In ethics, addresses the questions "What sorts of things are good or bad?" and "What actions are right or wrong?" In social and political philosophy, examines theories of human nature, social change, social institutions, and major twentieth-century political theories. Possible additional topics include aesthetics and philosophy of history.

PHL 4165 Moral Problems in Medicine (3 q.h.)
Social and moral problems created by medical science. Questions investigated include "Should a human life be prolonged under any condition and at any cost?" "What are the moral problems caused by the current medical definitions of death?" and "Is it morally right to predetermine the physical characteristics of future generations by genetic engineering?"

PHL 4170 The Human Search for Meaning (3 q.h.)

Examination of selected philosophical problems of human existence, such as freedom, death, sexuality, alienation, and becoming a person.

PHL 4180 Business Ethics (3 q.h.)

Ethical principles and considerations involved in making moral business decisions. Studies basic ethical viewpoints as a foundation; analyzes specific characteristics of business life through particular cases and examples.

PHL 4200 Logic (3 q.h.)

Essentials of lucid thinking in terms of basic logical concepts, including deductive and inductive reasoning, valid and invalid arguments, and the varied functions of language and definition. Also examines how to recognize and evaluate different kinds of arguments, methods of detecting and avoiding common errors in reasoning, and the link between structured thought and effective communication.

PHL 4220 The Meaning of Death (3 q.h.)

Various philosophical and religious views concerning the meaning of death. Discusses such questions as "What attitude should one take regarding one's own death?" "What role does death play in our personal relations to others?" and "Is it necessary to believe in an afterlife in order to give meaning to this life?"

PHL 4223 New Age Philosophy (formerly Philosophy of Consciousness) (3 q.h.)

Theories of consciousness, the possibility of higher states of consciousness, and some techniques, such as meditation, alleged to lead to higher states of consciousness. Readings may include psychological and parapsychological literature on the subject.

PHL 4233 Special Topics in Philosophy (3 q.h.)

Examination of a variety of subjects and themes, such as ancient philosophy, philosophy of science and technology, and ethical issues in race and gender. Because topics change from quarter to quarter, students may take this course more than once, provided they focus on a different topic each time.

PHL 4235 Personal Ethics (3 q.h.)

As we live our lives, we face many decisions about the "rightness" or "wrongness" of our ideas and actions. Explores two different approaches to moral dilemmas: utilitarian theory, which defines the good as the best possible outcome, and deontological theory, which states that actions themselves are either good or evil. Applies these ethical theories to the moral choices we make on issues such as abortion, the AIDS epidemic, capital punishment, nuclear arms, and taxation.

PHL 4243 Existentialism (3 q.h.)

Existential philosophy as understood through study of its greatest representatives, such as Kierkegaard, Nietzsche, Dostoyevsky, Heidegger, Jaspers, Camus, Sartre, and Merleau-Ponty. Focuses on the central themes of self-alienation, authenticity, and existential experiences.

PHL 4245 Philosophy of Religion (3 q.h.)

The arguments for the existence of God. Covers natural and moral evil, the soul, immortality, the evidence for miracles, and the nature of religious knowledge.

PHL 4247 Theistic, Atheistic, and Agnostic Philosophies (3 q.h.)

Selected theistic, atheistic, and agnostic philosophies. Questions studied include: "Is the belief in God necessary for a comprehensive philosophy of life?" "How does an atheistic philosophy explain and justify the 'higher values' such as love, beauty, and justice?" and "How is it possible to base a philosophy on the principle of agnosticism?"

PHL 4249 Woman's Spirituality (formerly Feminist Spirituality) (3 q.h.)

Women's religious experience as described in classical and contemporary sources. Readings include such works as *Womanspirit Rising*, *The Politics of Women's Spirituality*, and *Dreaming the Dark*.

PHL 4250 Philosophy of Human Nature (3 q.h.)

Philosophical and literary study of human nature. Questions include "What is human nature?" and "What is a human being?" Examines some of the philosophical answers to these questions, with special attention to the significance of tradition, social role, freedom, and decision.

PHL 4251 Images of Women in Philosophy (3 q.h.)

Philosophical approach to the study of women in society. Drawing from sources within the history of philosophy and literature, includes the role (ideal and actual) of women in society, love and marriage, oppression and isolation, and the cult of virginity.

PHL 4252 Women's Ethical Issues (3 q.h.)

The emerging feminist ethos as distinct from traditional descriptions of feminist morals and values. Discusses questions of politics, power, values, and actions. Readings include such works as De Beauvoir's *The Ethics of Ambiguity* and Daly's *Gyn-Ecology*.

PHL 4255 Women and Religion (3 q.h.)

The role and place of women in the major religions of the world and contemporary feminist challenges to these traditional understandings. Readings include such works as Carmody's *Women and Religion* and Daly's *Beyond God the Father*.

PHL 4256 Introduction to Feminist Thought (3 q.h.)

Introduction to feminist scholarship in various fields. Explores what constitutes knowledge when women's experiences, rather than men's, frame the questions, provide the data, and interpret that data.

PHL 4265 Contemporary Religious Issues in America (formerly Understanding Religion in America Today) (3 q.h.)

Study America's remarkable religious pluralism. Includes contemporary Christianity and Judaism, nontraditional Christian and non-Christian movements, cults, sects, and quasi-religious organizations. After becoming familiar with American religious foundations, students study the connections between religion and sociotechnological change, sex, biomedical ethics, politics, and the media. May include guest speakers.

PHL 4266 The Religious Right in Contemporary America (3 q.h.)

Evangelism, fundamentalism, extremist groups, and nontraditional Jewish and Christian movements. Also examines "priesthood of all believers," grace and the idea of the "elect," and the state of being "born again" as well as the New Deal, the Great Society, and the "conservative revolution." Includes background on the roots of these movements, from precolonial Europe

and Puritan America to the development of the Social Gospel. May include guest speakers.

PHL 4267 Cults and Sects (3 q.h.)

Examines the varieties of religious experience from the perspectives of sociology and psychology of religion. Focuses on such cultic and sectarian groups as Christian Science, the American Shakers, the Unification Church, the Hare Krishna movement, and the Black Muslims. Provides the student the opportunity to acquire critical investigative tools with which to analyze different religious expressions.

PHL 4270 The Great Western Religions (3 q.h.)

Study of the basic teachings of Judaism, Christianity, and Islam.

PHL 4273 Judaism (3 q.h.)

Philosophy of the Jewish religion, its metaphysical and ethical beliefs, and the philosophical origins of these beliefs.

PHL 4275 The Great Eastern Religions (3 q.h.)

Study of the basic teachings of Taoism, Confucianism, Buddhism, Hinduism, and Shintoism.

PHL 4277 Hinduism (3 q.h.)

The Hinduism of the *Upanishads*, the most explicit of the mystical religions. Also includes the devotional aspect of Hinduism as expressed in the *Bhagavad Gita*.

PHL 4279 Buddhism (3 q.h.)

Central teachings of Buddhism, including the doctrines that there is no independently existing immutable self or soul, that all phenomena are impermanent, that existence is suffering, that suffering has a cause, and that there is a way to eliminate suffering.

PHL 4280 Islam (3 q.h.)

History of Islam, its conflicts with the West in the past and in the present, Islamic beliefs, and the future of Islam as a world religion.

PHL 4293 Mysticism: East and West (3 q.h.)

Inquiry into mystical experience through a comparative study of the writings of Christian, Buddhist, and Hindu mystics and of secondary interpretive sources. Explores the potential oneness of humanity with God, the conflict of mysticism with traditional forms of religion, and the possibility of a common, cross-cultural basis for mysticism.

PHL 4317 Understanding the Bible (3 q.h.)
This course introduces students to the Old and New Testaments so that they may enter into a dialogue with the Bible, understanding not only what it says, but why it is said that way. Discussion focuses on the bible's social, political, and cultural backgrounds.

PHL 4330 Myths, Dreams, and Mysteries (formerly The Encounter of Psychology and Religion) (3 q.h.)

Exploration of the ways the sense of self shapes and is shaped by religion. Emphasis on dominant Western psychologies and religions. Examination of the role of religious values in defining cultural values, and of these values in determining a sense of self.

PHL 5220 The Meaning of Death (3 CEUs)
Same as PHL 4220.

PHYSICS

PHY 4101 College Physics 1* (4 q.h.)
Introduction to mechanics, including units of measurement, vectors, accelerated motion, and Newton's laws of motion. Further topics include conservation of energy, work, momentum and introduction to elements of heat, mechanical waves and vibrating bodies. Laboratory experiments and classroom demonstrations are an integral component of this course. (This course cannot be utilized for credit towards technology degrees in the School of Engineering Technology.)

PHY 4102 College Physics 2* (4 q.h.)
Introduction to magnetism, magnetic fields, electromagnetic induction, electrostatics and electric circuits. Further areas covered include appropriate topics in optics, nuclear and atomic physics. Laboratory experiments and classroom demonstrations are an integral component of this course. (This course cannot be utilized for credit towards technology degrees in the School of Engineering Technology.) *Prereq. PHY 4101.*

PHY 4117 Physics 1* (4 q.h.)
Introduces vectors and balanced forces, accelerated motion, projectile motion, Newton's laws, work and energy, momentum, and equilibrium of rigid bodies, and moment of inertia. *Prereq. MTH 4107 or concurrently.*

PHY 4118 Physics 2* (4 q.h.)
Explores rotational motion, periodic motion, electric forces and fields, electric potential,

capacitance, electromotive force, and direct current circuits. *Prereq. PHY 4117.*

PHY 4119 Physics 3* (4 q.h.)
Covers magnetic fields and forces, electromagnetic induction, inductance, Gauss's law, electromagnetic waves, mechanical waves, sound, and the interference and diffraction of light. *Prereq. PHY 4118.*

PHY 4196 Physics Laboratory 1* (1 q.h.)
First in a three-quarter sequence for SET students. Lab course that accompanies PHY 4117 and in which students perform experiments selected from physics topics covered concurrently in PHY 4117. *Prereq. PHY 4117 concurrently.*

PHY 4197 Physics Laboratory 2* (1 q.h.)
Second in a three-quarter sequence for SET students. Lab course that accompanies PHY 4118 and in which students perform experiments selected from physics topics covered concurrently in PHY 4117 and PHY 4118. *Prereq. PHY 4118 concurrently; PHY 4196.*

PHY 4198 Physics Laboratory 3* (1 q.h.)
Third in a three-quarter sequence for SET students. Lab course that accompanies PHY 4119 and in which students perform experiments selected from physics topics covered concurrently in PHY 4118 and PHY 4119. *Prereq. PHY 4119 concurrently; PHY 4197.*

POLITICAL SCIENCE

POL 4103 Introduction to Politics (3 q.h.)
Introduction to contemporary political science, including consideration of basic concepts in political analysis, the role of government institutions, political representation, political ideologies, and the scope and methods of political science.

POL 4104 Introduction to American Government (3 q.h.)
American governmental and political processes, constitutional institutions, political behavior, and liberties.

POL 4105 Introduction to Comparative Politics (3 q.h.)
Comparative study of constitutional and totalitarian systems, including the Western European and Soviet patterns.

**This is a School of Engineering Technology course, which is offered at a different tuition rate than that of University College.*

POL 4106 Introduction to Politics (4 q.h.)
Basic political concepts and forces of organization from the classical Greeks to the modern nation-state. The Soviet Union and the United Kingdom are contrasted as contemporary illustrations of the institutional distinction between a totalitarian and a constitutional system. *For Alternative Freshman-Year students only.*

POL 4110 The Great Political Thinkers (3 q.h.)
Explores the great political thinkers from ancient Greece to the twentieth century. Probes the creative genius of such theorists as Plato, Aristotle, Aquinas, Hobbes, Hegel, Locke, Rousseau, Mill, and Marx.

POL 4112 Political Elites in Advanced Industrial Societies (3 q.h.)
This course focuses on theories of political elites in advanced industrial societies. The question of who rules is central. What role do elites play in modern democracies? Are there in fact elites? The theories of Mosca, Pareto, Michels, and the modern debate represented by thinkers such as Mills and Dahl are central to the course. The course also presents the Marxist, pluralist, and corporatist paradigms for understanding politics with respect to the issue of elites.

POL 4300 Introduction to Public Administration (formerly Public Administration 1) (3 q.h.)
Introduction to the theory, forms, and processes of administration at the national and state levels.

POL 4301 Case Studies in Public Administration (formerly Public Administration 2) (3 q.h.)
Case-study examination of the relationship between the theory and practice of public administration. *Prereq. POL 4300 or equiv.*

POL 4302 Public Administration (Intensive) (6 q.h.)
Same as POL 4300 and POL 4301.

POL 4303 Public Personnel Administration (3 q.h.)
Study basic elements of personnel administration, including recruitment, training, classification, promotion, and executive development. Pays special attention to current problems, such as equal opportunity, public employee unionism, and collective bargaining.

POL 4304 Public Budgeting (3 q.h.)
Politics, procedures, and goals of government budgeting at the federal, state, and local levels are covered. Includes expense, capital, and program budgeting.

POL 4305 Organizational Theory (3 q.h.)
Examines people and organizations, focusing on organizational and societal problems as a way of understanding how we can survive in a bureaucratic system.

POL 4306 Public Policy Analysis (3 q.h.)
Procedures for the analysis of public policy are studied, including discussion of selected cases of public policy at the local, state, or federal level.

POL 4307 Politics of Health in International Development (formerly The Politics of Health) (3 q.h.)
Explores the problems of health in developing countries, particularly during the last decade. Examines the political dynamics at the village, national, and global levels that have hindered efforts to establish health care delivery systems. Analyzes issues of nationalism and problems of refugees.

POL 4309 Business and Government (3 q.h.)
Explores the interaction between business and government, and the constraints within which each must operate in our society. Issues to be raised include the structure and function of the corporation, understood as a political entity; the "revolving door" between business and government; the impact of corporations on democratic processes and institutions; and the degree to which political rights and economic rights are intertwined.

POL 4310 American Political Thought (3 q.h.)
Topics include political thought from the Colonial period to the present, including study of the impact of religious, economic, and judicial theories on the structure of American ideas.

POL 4311 Research Methods (3 q.h.)
Introduction to some of the most common methods of conducting political science research. Includes problems of theory construction and data-gathering and such analytical research tools as bibliographical aids and the computer.

POL 4312 Political Parties and Pressure Groups (3 q.h.)

Discusses party government in the United States focusing on the interaction of party and government.

POL 4313 State and Local Government (formerly Government and Politics and the States) (3 q.h.)

State and local governments, their problems, and functional and operational responses to these problems are examined.

POL 4314 Urban and Metropolitan Government (3 q.h.)

Explores political, structural, and functional problems of an urbanizing United States. Includes an analysis of urban, suburban, and metropolitan governments.

POL 4316 Ecology in Political Perspective (3 q.h.)

Human beings have become major actors for ecological change. Not only are we a part of nature, we use and reshape nature. This course is structured to explore the impact of human beings on nature, and to prognosticate what will happen if present trends continue. A core interest in the course will be to examine the efforts of interested citizens and organizations to use political means to control and direct these trends.

POL 4318 The American Presidency (3 q.h.)

Study of the nation's chief executive. Includes topics such as the presidential electoral process, the president's many constituencies, and the differing styles of twentieth-century presidents. Also covers constitutional and extraconstitutional powers of the office.

POL 4319 The Congress (3 q.h.)

Institutional and functional analysis of the roles of Congress are examined, as well as the chief executive, and political parties in the legislative process.

POL 4320 American Constitutional Law (3 q.h.)

A case analysis of the development of Federalism, the separation of powers, and the role of the federal and state courts in constitutional development.

POL 4321 Civil Liberties (formerly Civil Rights) (3 q.h.)

Examination of quality and content of civil liberties in the United States. Emphasizes the First, Fifth, Sixth, Fourteenth, and Fifteenth amendments to the Constitution.

POL 4322 Criminal and Civil Due Process (formerly Procedural Due Process) (3 q.h.)

Study of due process in the American constitutional scheme.

POL 4325 Politics and Film (formerly The Politics of Films) (3 q.h.)

The relationship between films and politics is explored. Films are analyzed for their political content and impact on specific controversies and on politics and society as a whole. (*Laboratory fee.*)

POL 4326 The Sixties (3 q.h.)

A political, philosophical, sociological and cultural analysis of the Sixties is presented. The major issues of that era are discussed: civil rights, the Vietnam War, the student movement. Special attention is given to the arts, including music and film.

POL 4327 Women in American Politics (formerly Sex Roles in American Politics) (3 q.h.)

Topics such as the roles of women in American government and politics, including the traditional roles—or absence thereof—of women in American politics, the suffrage movement, the impact of sex on achieving political power and office, the growing importance of the women's vote, the women's movement, and political action to support women's issues are covered.

POL 4329 Psychology of Politics (3 q.h.)

How do psychological processes affect politics? How are people's political beliefs and attitudes shaped? What needs, intrinsic or otherwise, do people bring into the political process? What is "human nature," and what impact does it have on society? Is a non-repressive society possible? These are some of the issues to be discussed in this course, which will attempt to integrate politics and psychology into a comprehensive analytical framework.

POL 4330 Comparative Politics (3 q.h.)

Discusses political culture, organization, and behavior in different national settings.

POL 4331 International Relations (3 q.h.)

Studies elements of and limitations on national power. Discusses contemporary world politics, problems of war, and peaceful coexistence.

POL 4332 International Organization (3 q.h.)
The development of international organizations, emphasizing the United Nations, specialized agencies, and regional organizations, is explored.

POL 4333 International Law (3 q.h.)
Examines the procedural and substantive study of the legal relations among nation-states.

POL 4335 Formulating American Foreign Policy (3 q.h.)
The Constitution and political instruments for the formulation of American foreign policy are discussed.

POL 4336 American Foreign Policy (3 q.h.)
Study of recent and current American foreign affairs.

POL 4337 The Politics of Arms Control (3 q.h.)
Discusses the nuclear arms rivalry between the United States and the Soviet Union, along with opportunities for curtailing it through arms control. Includes the nature and purposes of nuclear weapons, past arms-control agreements, and recent breakthroughs. Explores current options for arms control.

POL 4338 European Political Parties (3 q.h.)
Emphasizes political party systems in England, France, and Germany, and their ideology, organization in and out of Parliament, electoral strategies, and voter behavior.

POL 4339 Government and Politics in the Soviet Union (Commonwealth of Independent States) (3 q.h.)
Explores modern totalitarian theory and practice, followed up with studies of the ideological and historical basis of the Soviet dictatorship.

POL 4341 Soviet Foreign Policy (3 q.h.)
Discussion of the evolution of Soviet foreign policy from 1917 to the present day, including the development of the international Communist movement and the formation of the Commonwealth of Independent States.

POL 4342 Eastern Europe in Transition (formerly Communism in Eastern Europe) (3 q.h.)
Studies the conditions and circumstances surrounding the establishment of Communist regimes in eastern Europe following World War II and their relations with the Soviet Union.

POL 4350 Politics and Policies of the Developing Nations (3 q.h.)
Covers colonialism, the struggles for independence, and the common problems of developing nations. Includes economic development, urbanization, cultural fragmentation, and revolution.

POL 4352 Government and Politics of Latin America (3 q.h.)
Explores the historical background of the Latin American nations and their cultural, economic, social, and political characteristics, including political violence and the breakdown of democratic governments.

POL 4356 Government and Politics of Northern Africa (3 q.h.)
A comparative analysis of political culture, organization, and behavior of African states north of the Sahara, with emphasis on Morocco, Algeria, Tunisia, and Egypt.

POL 4357 Government and Politics of South Africa (3 q.h.)
An analysis of political culture, organization, and behavior of South Africa. Examines the South African history to show how South Africa got where it is today, including the nature, implications, and problems of apartheid, and prospects for the future.

POL 4359 Government and Politics in the Middle East (3 q.h.)
Political change, economic growth, and social adaptation in selected countries is discussed. The emergence of the Middle East from subjection to self-assertion is examined, focusing on such topics as the influence of Western Modernism, Muslim fundamentalism, inter-Arab rivalries, Arab-Israeli conflict, and the civil strife in Lebanon.

POL 4362 Government and Politics of Southeast Asia (3 q.h.)
Explores political instability and problems of establishing democratic structures and processes in the Philippines, Thailand, and India.

POL 4364 China's Foreign Policy (3 q.h.)
Examines Beijing's relations with Africa, the rest of Asia, the Soviet orbit, and the West. Covers policy objectives, strategy, tactics, and the methods of decision-making in both the party and state apparatus.

POL 4365 Government and Politics of China (3 q.h.)
Discusses Chinese political culture, emphasizing the nineteenth-century cultural, eco-

nomic, and political impact of the West, the emergence of the Communist party under the leadership of Mao Tse-Tung, and the progressive disintegration of Kuomintang leadership.

POL 4367 Government and Politics of Japan (3 q.h.)

Examines the historical development of the Japanese nation, with particular attention to the growth of fascism and efforts to create a viable democracy since World War II.

POL 4370 Introduction to Political Theory (3 q.h.)

Discusses the development of the political ideas of the Western world, including the ideas of the major philosophers of Greece, Rome, the Christian Era, and the Renaissance.

POL 4371 Modern Political Theory (3 q.h.)

Explores political ideas and systems of thought from Machiavelli to the present. *Prereq.* POL 4370 or *equiv.*

POL 4372 Contemporary Political Thought (3 q.h.)

Analyzes current ideas, ideologies, and political movements. Examination of such topics as neo-conservatism, neoliberalism, neo-Marxism, and women's liberation.

POL 4373 Islamic Political Thought (3 q.h.)
Introduces Islamic thought and political theory. Analyzes such classical theorists as Avicenna, Averroes, Al-Ghazali, and Ibn Khaldun, and such modern theorists as Abduh, Iqbal, and Shari'ath.

POL 4375 Consumer Advocacy 1 (3 q.h.)

A pragmatic course, designed to define and expand the role of consumers in the marketplace. Focuses on contemporary consumer issues, touching upon the legal, social, economic, and political aspects of consumer problems and the role of consumer lobbies as special interest groups. More specific consumer problems, such as those of the elderly, may also be explored.

POL 4376 Consumer Advocacy 2 (3 q.h.)

Continuation of POL 4375. *Prereq.* POL 4375 or *equiv.*

POL 4377 Consumer Advocacy 3 (3 q.h.)

Continuation of POL 4376. *Prereq.* POL 4376 or *equiv.*

POL 4378 Current Political Issues (3 q.h.)

Explores the constitutional and political basis of selected problems in American political life.

POL 4815 Advanced Tutorial 1 (3 q.h.)

Opportunity to take an upper-level course independently. See page 23 for details. *Prereq.* 87 q.h.

POL 4816 Advanced Tutorial 2 (3 q.h.)

See POL 4815.

POL 4820 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 24 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

POL 4821 Independent Study 2 (3 q.h.)

See POL 4820.

POL 4822 Independent Study 3 (3 q.h.)

See POL 4820.

POL 4830 Honors Program 1 (4 q.h.)

Opportunity to undertake an in-depth research study project. See page 24 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

POL 4831 Honors Program 2 (4 q.h.)

See POL 4830.

POL 4832 Honors Program 3 (4 q.h.)

See POL 4830.

POL 5375 Consumer Advocacy 1 (3 CEUs)

Same as POL 4375.

PSYCHOLOGY

PSY 4110 Introduction to Psychology:

Fundamental Issues (formerly Fundamental Issues in Psychology) (3 q.h.)

Explores fundamental principles and issues of contemporary scientific psychology, which are approached as a method of inquiry as well as a body of knowledge. Examines the origins and methods of psychology, biological foundations of behavior, states of consciousness, learning, and memory.

PSY 4111 Introduction to Psychology:

Developmental Aspects (formerly Developmental Aspects in Psychology) (3 q.h.)

Covers growth and the life-cycle, language, mental abilities, sensory and perceptual processes, and social interaction. *Prereq.* PSY 4110 or *equiv.*

PSY 4112 Introduction to Psychology: Personal Dynamics (formerly Personal Dynamics in Psychology) (3 q.h.)
Examines motivation, emotion, personality theory and measurement, abnormal psychology, and therapy. *Prereq.* PSY 4110 or *equiv.*

PSY 4113 Introduction to Psychology Intensive A (formerly Psychology Intensive) (9 q.h.)
Same as PSY 4110, PSY 4111, and PSY 4112.

PSY 4114 Introduction to Psychology Intensive B (6 q.h.)
Same as PSY 4110 and PSY 4111.

PSY 4115 Introduction to Psychology Intensive C (6 q.h.)
Same as PSY 4111 and PSY 4112. *Prereq.* PSY 4110 or *equiv.*

PSY 4220 Statistics in Psychology 1 (3 q.h.)
Scales of measurement in psychological research, measures of central tendency, and variability are discussed. *Prereq.* PSY 4111 and PSY 4112 or *equiv.*

PSY 4221 Statistics in Psychology 2 (3 q.h.)
Introduces measures of correlation, probability, and statistical distributions. *Prereq.* PSY 4220 or *equiv.*

PSY 4222 Statistics in Psychology 3 (3 q.h.)
Explores parametric and nonparametric tests of significance, including chi square, t-test, F test, and simple analysis of variance. *Prereq.* PSY 4221.

PSY 4231 Psychology of Learning (3 q.h.)
Studies the basic principles and techniques of operant and Pavlovian conditioning and their applications to therapeutic, educational, and specialized training programs. *Prereq.* PSY 4111 or PSY 4112 or *equiv.*

PSY 4232 Motivation (3 q.h.)
Topics include various aspects of motivation, including primary and secondary reinforcement, unconscious motivation, effectuate motivation, and the assessment of motives. *Prereq.* PSY 4112 or *equiv.*

PSY 4240 Development: Infancy and Childhood (formerly Developmental Psychology: Infancy and Childhood) (3 q.h.)
Explores human development from infancy through late childhood. Covers physical, cognitive, and psychosocial development,

including the development of language, morality, and interpersonal relationships.

PSY 4241 Development: Adolescence (formerly Developmental Psychology: Adolescence) (3 q.h.)
Examines development during the second decade of life, emphasizing the tasks and problems confronting the individual adolescent. Includes topics such as biological, social, and cognitive changes as they relate to the creation of a stable, individual identity.

PSY 4242 Development: Adulthood and Aging (formerly Developmental Psychology: Adulthood and Old Age) (3 q.h.)
Discusses the unique features and problems of development from the adult years to death. Emphasizes changes that accompany career, marriage, and family developments and the specific psychological adjustments required of the aging person.

PSY 4243 Aging and Mental Health (3 q.h.)
Covers emotional reactions to age-related issues, such as retirement, bereavement, and health status. Discusses depression and suicide, behavior disorders, substance use problems, and the dementias of old age and the effects these problems have on families and the community. Includes a survey of special assessment techniques, mental health services for the elderly, and public health policies for improved care.

PSY 4262 Memory and Thinking (formerly Cognitive Psychology) (3 q.h.)
Explores the mental processes involved in the acquisition, organization, and use of knowledge, including pattern recognition and memory. *Prereq.* PSY 4111, PSY 4112, or *equiv.*

PSY 4263 Psycholinguistics (3 q.h.)
Covers topics such as the nature and structure of language, various theories of human production and perception of language, and related experimental findings. *Prereq.* PSY 4111 or *equiv.*

PSY 4270 Social Psychology 1 (3 q.h.)
Studies the socialization process, social motives, interpersonal perception, and group membership and structure. *Prereq.* PSY 4111 or *equiv.*

PSY 4271 Social Psychology 2 (3 q.h.)
Examines topics of attitudes, prejudice and ethnic relations, leadership, mass behavior

and social movements, and the effects of mass media on communication. *Prereq.* PSY 4270 or *equiv.*

PSY 4272 Personality (3 q.h.)

Studies the normal personality and its growth and development. Includes concepts such as environmental and genetic contributions, assessment of personality, research, and a survey of the major personality theories. *Prereq.* PSY 4112 or *equiv.*

PSY 4275 Group Processes (3 q.h.)

Analyzes group structure and its effect on behavior. Topics include leadership, communication, conflict resolution, and group problem-solving. Student participation used to illustrate and develop group-related concepts.

PSY 4276 Stress and Its Management (3 q.h.)

Covers stress and its effects on human behavior. Considers the causes of stress from a variety of theoretical perspectives. Techniques and procedures for stress management and reduction examined in detail.

PSY 4280 Human Sexuality and Love (3 q.h.)

An examination, both theoretical and experimental, of psychological, biological, and social aspects of sexuality and loving. Topics include sexual anatomy and physiology; birth control; gender identity and gender role; romantic love (with emphasis on successful love relationships); diverse sexual lifestyles; sexual dysfunctions and therapy; and enhancement of one's own sexual awareness and pleasure and that of one's partner.

PSY 4290 Psychology of Women (3 q.h.)

Examines women, historically and in contemporary life, including their social roles and their behavior as determined genetically, physiologically, and psychologically. Includes discussion on the implications for women's future lifestyles, roles, and contributions. *Prereq.* PSY 4111 or PSY 4112 or *equiv.*

PSY 4351 Physiological Psychology (3 q.h.)

Introduces how nerves function and work together in the nervous system; how our sense organs provide the brain with information about the outside world; how the brain acts to produce behavior; and how such psychological concepts as perception, learning, motivation, arousal, and emotion

may relate to nervous system activity. *Prereq.* PSY 4111 or PSY 4112 or *equiv.*

PSY 4352 Drugs and Behavior (3 q.h.)

Considers the application of quantitative behavior techniques in animals and humans to determine the behavioral effects of pharmacological agents. Includes systematic survey of experimental literature. *Prereq.* PSY 4111 or PSY 4112 or *equiv.*

PSY 4370 Impact of Psychology on Society (3 q.h.)

Includes developments such as the uses of intelligence and aptitude tests, psychosurgery and electroconvulsive therapy, techniques of behavior modification and control, minority and women's rights movements, direct brain stimulation by implanted electrodes, use of psychoactive drugs, use of the lie detector, and the application of experimental techniques to human beings. *Prereq.* PSY 4111 or *equiv.*

PSY 4372 Abnormal Psychology 1 (3 q.h.)

Introduces the etiology and dynamics of the abnormal personality. *Prereq.* PSY 4112 or *equiv.*

PSY 4373 Abnormal Psychology 2 (3 q.h.)

Examines symptomatology and treatment of the neuroses and psychoses. *Prereq.* 4372 or *equiv.*

PSY 4374 Abnormal Psychology 3 (3 q.h.)

Explores psychosomatic, psychopathic, and organic disorders; varieties of psychotherapy. *Prereq.* PSY 4373 or *equiv.*

PSY 4381 Sensation and Perception (3 q.h.)

Introduces the nature of the perceptual world, the nature of object recognition and identification, spatial organization, contextual effects, learning and perception, and the influence of attitudinal, motivational, and personality factors on perception. *Prereq.* PSY 4111 or *equiv.*

PSY 4390 Industrial Psychology 1 (3 q.h.)

Examines psychology as applied to industry, including such topics as selection and placement procedures, employee assessment, individual differences and their evaluation, and the place of psychological tests in industry. *Prereq.* PSY 4111 or PSY 4112 or *equiv.*

PSY 4391 Industrial Psychology 2 (3 q.h.)

Covers personnel training and development, motivation and work, attitudes and job satisfaction, engineering psychology, and human

factors in accident causation. *Prereq.* PSY 4390 or *equiv.*

PSY 4392 Industrial Psychology 3 (3 q.h.)
Discusses supervision and leadership, morale, personnel counseling, the psychology of labor-management relations, human relations, and organizational behavior. *Prereq.* PSY 4391.

PSY 4471 Psychological Therapies (3 q.h.)
Studies techniques used for treating deviant behavior, from classical psychoanalytical therapies through methods of behavior modification. *Prereq.* PSY 4374 or *equiv.*

PSY 4561 Experimental Psychology 1 (3 q.h.)
Students conduct experiments focusing on the scientific method in the design, execution, analysis, and reporting of psychological investigations. *Prereq.* PSY 4222.

PSY 4562 Experimental Psychology 2 (3 q.h.)
Continuation of PSY 4561. *Prereq.* PSY 4561.

PSY 4563 Experimental Psychology 3 (3 q.h.)
Continuation of PSY 4562. *Prereq.* PSY 4562.

PSY 4611 Senior Seminar in Psychology (3 q.h.)
Small groups of students meet to discuss topics of mutual interest in psychology. Each seminar has a different focus, depending upon the student group and the instructor. *Prereq.* PSY 4561 and PSY 4562.

PSY 4813 Field Work in Psychology (6 q.h.)
Designed to enhance career development by allowing students to earn credit for the application of their academic backgrounds to practical problems in the work place. See page 23 for details.

PSY 4815 Advanced Tutorial 1 (3 q.h.)
Opportunity to take an upper-level course independently. See page 23 for details. *Prereq.* 87 q.h.

PSY 4816 Advanced Tutorial 2 (3 q.h.)
See PSY 4815.

PSY 4820 Independent Study 1 (3 q.h.)
Opportunity to undertake special research. See page 24 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

PSY 4821 Independent Study 2 (3 q.h.)
See PSY 4820.

PSY 4822 Independent Study 3 (3 q.h.)
See PSY 4820.

PSY 4891 Honors Program 1 (4 q.h.)
Opportunity to undertake an in-depth research study project. See page 24 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

PSY 4892 Honors Program 2 (4 q.h.)
See PSY 4891.

PSY 4893 Honors Program 3 (4 q.h.)
See PSY 4891.

PSY 5242 Development: Adulthood and Aging (3 CEUs)
Same as PSY 4242.

PSY 5243 Aging and Mental Health (3 CEUs)
Same as PSY 4243.

PURCHASING

PUR 4351 Purchasing 1 (3 q.h.)
Introduction to the function of purchasing in the industrial organization. Includes purchasing responsibilities, objectives, organization, and personnel requirements; purchasing policy and systems; the role of the computer in regulating purchasing planning, transactions, and information retrieval; acquisition of purchased materials, development of sources of supply, and quality assurance; and determination and maintenance of required inventory levels. Also covers control of inventory investment, price determination, cost and price analysis of purchase transactions, make or buy decisions, and the role of standardization and value analysis.

PUR 4352 Purchasing 2 (3 q.h.)
The process of purchase negotiations, budgets, and purchase of capital equipment is examined. Includes purchasing for public and nonprofit institutions, disposition of surplus and obsolete materials, traffic and material handling, forward buying and speculation, ethical considerations in purchasing, purchasing law, contract cancellations, purchasing reports, evaluation of purchasing performance, and control and audit procedures. *Prereq.* PUR 4351.

PUR 4353 Purchasing (Intensive) (6 q.h.)
Same as PUR 4351 and PUR 4352.

PUR 4357 Business Negotiations (3 q.h.)

Explores buyer-seller communication and exchange. Includes the interactive process for arriving at a satisfactory agreement between buyer and prospective vendor and accepted strategies employed by both parties. Discusses economic and technical considerations and the psychological and interpersonal environments of negotiations.

PUR 4358 Materials Requirements Planning (MRP) (3 q.h.)

Includes determination of material requirements based on the master production schedule; as well as calculation of the time periods in which materials must be available. The computer-based MRP system may be used as preparation for APICS certification exams.

PUR 4365 Production Activity Control (3 q.h.)

Topics include principles, approaches, and techniques used to plan, schedule, control, and evaluate the effectiveness of factory production operations. Examines scheduling and control techniques used in various manufacturing environments. Course may be used as preparation for APICS Certification examinations.

PUR 4370 Inventory Management (3 q.h.)

Explores basic inventory management objectives, from the control of raw materials to finished goods and distribution inventory management. Includes aggregate inventory controls, lot sizing, customer service objectives, and the financial and physical controls necessary for effective inventory management. Course may be used as preparation for APICS Certification examinations.

PUR 4390 Just-In-Time Manufacturing (JIT) (3 q.h.)

Just-In-Time manufacturing is a natural evolution of traditional practices which strives towards increasing through-puts, decreasing inventory investments, decreasing operating expenses, improving quality, etc. This course has been developed to introduce the student to the philosophies, principles, concepts, and techniques of Just-In-Time purchasing and manufacturing. Emphasis on the differences between traditional and J.I.T. manufacturing will be discussed in detail. This course will also help the student to prepare for the APICS Just-In-Time certification examination.

PUR 4393 World Class Manufacturing (3 q.h.)

Focuses on how industries are changing manufacturing operations to become world class competitors by using innovative, effective manufacturing techniques. Discusses implementing improvements immediately on the shop floor, measuring results, improving quality, eliminating waste, responding rapidly to customer demands, reducing inventories and manufacturing costs.

PUR 4395 Master Production Scheduling (MPS) (3 q.h.)

This course is divided into two sections: Forecasting and Master Production Scheduling. The Forecasting Section develops the concept of Forecasting; qualitative, intrinsic and extrinsic techniques, Forecast source data, Forecast accuracy, statistics, the relation of Forecasting to other processes and Management Considerations. The Master Production Scheduling Section develops the concepts of Master Scheduling Planning and Control, development and utilization of a Master Production Scheduler. Finally, the course discusses the link between Forecasting, the Master Production Schedule and Customer Orders. This course can be used for preparation for the APICS certification examination.

PUR 4396 Systems and Technologies (3 q.h.)

Systems and Technologies is the newest APICS module which focuses on the relationships between the functions of production and inventory control and manufacturing. The purpose of the course is to help the student understand the integrated needs of both existing and emerging technologies, and the synergy necessary to provide positive results in the production and inventory environment. This course helps the student recognize business, marketing, and manufacturing strategies that drive the choice and configuration of production and inventory functions, tools, and methods. This course can be used for preparation for the APICS certification examination.

PUR 4600 Honors Program 1 (4 q.h.)

Opportunity to undertake an in-depth research study project. See page 24 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

PUR 4601 Honors Program 2 (4 q.h.)
See PUR 4600.

PUR 4602 Honors Program 3 (4 q.h.)

See PUR 4600.

PUR 4701 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 24 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

PUR 4702 Independent Study 2 (3 q.h.)

See PUR 4701.

PUR 4703 Independent Study 3 (3 q.h.)

See PUR 4701.

PUR 4800 Advanced Tutorial 1 (3 q.h.)

Opportunity to take upper-level course independently. See page 23 for details. *Prereq.* 87 q.h.

PUR 4801 Advanced Tutorial 2 (3 q.h.)

See PUR 4800.

RADIOLOGIC TECHNOLOGY

RAD courses are only open to admitted students.

RAD 4100 Radiologic Technology

Orientation 1 (3 q.h.)

Examines history of X-radiation, radiology department organization, medical terminology, patient care and nursing procedures, and contrast media.

RAD 4101 Radiologic Technology

Orientation 2 (3 q.h.)

Study of medical and surgical diseases. *Prereq.* RAD 4100.

RAD 4102 Radiologic Science 1 (4 q.h.)

Basic concepts of physics, units of measurement, Newton's law of motion, work, energy, atomic theory of matter, electric currents, magnetism, generators, motor production, control of high voltage, and X-ray production are covered. *Prereq.* MTH 4110.

RAD 4103 Radiologic Science 2 (4 q.h.)

Topics include interaction of X-rays and matter; modern X-ray tubes; X-ray circuits; fluoroscopic systems; and properties of solids, liquids and gasses. Also covers temperature, heat transfer and their application. *Prereq.* RAD 4102.

RAD 4104 Principles of Radiology 1

(4 q.h.)

Practical, basic radiation protection and the principles of positioning patients for radiographic studies are covered. *Prereq.* RAD 4100.

RAD 4105 Principles of Radiology 2

(4 q.h.)

Explores principles of precise body positioning for detailed radiographic studies. *Prereq.* RAD 4104.

RAD 4106 Radiologic Photography and Exposure 1 (4 q.h.)

Examines basic principles of image formation, electromagnetic spectrum, X-ray tube construction, factors controlling radiographic quality and patient exposure.

RAD 4107 Radiologic Photography and Exposure 2 (4 q.h.)

Examines mathematical formulas used in radiography. Includes in-depth study of sensitometry, phototiming principles, radiographic film techniques and electronic image capture and recording. *Prereq.* RAD 4103 and RAD 4106.

RAD 4116 Radiology Practicum 1 (4 q.h.)

Students apply theoretical principles by performing radiographic procedures under supervision in a direct patient care setting. Requires four hours of classroom education and assigned homework. Emphasizes patient safety, radiation protection, and basic, routine diagnostic procedures. *Prereq.* RAD 4104 and RAD 4106.

RAD 4117 Radiology Practicum 2 (4 q.h.)

Continuation of RAD 4116. Emphasizes routine diagnostic procedures, including fluoroscopy, operating room and portable radiography. *Prereq.* RAD 4116 and RAD 4105.

RAD 4118 Radiology Practicum 3 (4 q.h.)

Continuation of RAD 4117. Emphasizes advanced diagnostic procedures, including invasive and interventional studies. Minor rotations are scheduled for related imaging departments. *Prereq.* RAD 4117 and RAD 4107.

RAD 4119 Radiology Practicum 4 (4 q.h.)

Continuation of RAD 4118. Final clinical practicum leads to demonstration of accomplishment of terminal clinical competencies. *Prereq.* RAD 4118.

RAD 4121 Principles of Photography and Exposure Lab 1 (1 q.h.)

Energized x-ray laboratory activities designed to complement RAD 4106.

RAD 4122 Principles of Photography and Exposure Lab 2 (1 q.h.)

Continuation of RAD 4121. Designed to complement RAD 4107.

RAD 4130 Ultrasound Physics and Instrumentation (3 q.h.)

Introduces the physics of ultrasonographic imaging. Topics include the nature of ultrasound, propagation of ultrasound through tissues, and the construction and generation of ultrasound transducers. Discussions of ultrasonographic instruments include doppler, pulse echo devices, and image storage/display media. Covers quality assurance, bioeffects and safety concerns of ultrasonographic imaging. *Prereq.* MTH 4111.

RAD 4131 Abdominal Ultrasonography 1 (3 q.h.)

Introduces the fundamentals of ultrasonographic imaging of major organs of the adult abdomen. Discusses patient preparation, exam protocol and follow-up patient care. Emphasizes basic scanning techniques along with image recognition of the gastrointestinal, biliary and urinary tracts.

RAD 4132 Echocardiography 1 (3 q.h.)

Introduces the fundamentals of ultrasonographic imaging of the adult cardiovascular system. Discusses cardiac anatomy and physiology, ultrasonographic equipment and operation, scanning positions, M-mode, two-dimensional and doppler echocardiography. *Prereq.* RAD 4304 and RAD 4130.

RAD 4133 Obstetrics and Gynecological Ultrasound 1 (3 q.h.)

Introduces the fundamentals of ultrasonographic imaging of structures in the adult female pelvis. Discusses normal pelvic anatomy and physiology, patient exam preparation, equipment operation, scanning protocols and image recognition. *Prereq.* RAD 4304 and RAD 4130.

RAD 4134 Pediatric Echocardiography (3 q.h.)

Introduces the fundamentals of echocardiographic imaging on pediatric patients. Discusses normal anatomy, normal hemodynamics, congenital and acquired pathologies, instrumentation and scanning techniques. Stresses the understanding of ancillary recording modalities and functional assessments. *Prereq.* RAD 4304 and RAD 4130.

RAD 4141 Abdominal Ultrasonography 2 (3 q.h.)

Introduces students to advanced principles of ultrasonographic imaging of the adult abdomen. Emphasis on the evaluation of the

abdomen for specific diseases. Discusses linkage between medical laboratory test results and ultrasound exam protocols. Recognition of common pathologies of major abdominal structures will be accented. *Prereq.* RAD 4131.

RAD 4142 Echocardiography 2 (3 q.h.)

Introduces advanced principles of ultrasonographic imaging of the adult cardiopulmonary system. Emphasis on developing an understanding of specific exam protocols that will demonstrate precise cardiopulmonary structures. Discusses new state-of-the-art imaging modalities. *Prereq.* RAD 4132.

RAD 4143 Obstetrics and Gynecological Ultrasound 2 (3 q.h.)

Introduces advanced principles of ultrasonographic imaging of the female pelvis. Emphasis on demonstrating selected obstetrical and gynecological diseases and neoplasms ultrasonography. Stresses patient preparation, exam protocol and recognition of normal variants. *Prereq.* RAD 4133.

RAD 4170 Magnetic Resonance Imaging 1 (3 q.h.)

A comprehensive overview of the physics of magnetic resonance imaging. Stresses basic imaging concepts and various techniques associated with MRI exams. Discusses patient screening and necessary safety guidelines required to work in an M.R.I. department. *Prereq.* RAD 4304. *Must be a registered (A.R.R.T.) radiologic technologist.*

RAD 4304 Cross-Sectional Anatomy (4 q.h.)

Introduces regional approach to anatomy. Reviews standard anatomy, with emphasis on relations of organs and structures to transverse and longitudinal section appearance.

RAD 4305 Advanced Radiologic Technology (4 q.h.)

Special procedures including cardiovascular procedures, neuroradiology, lymphangiography, and intervention studies are explored. Exam methodology, required equipment, special patient care, contrast media, and contra-indications are also covered. *Prereq.* RAD 4103, RAD 4105, RAD 4107.

RAD 4306 Radiation Protection—Radiobiology (4 q.h.)

Topics include atomic structure, properties of radioactive materials, units of radiation,

long and short-term biological effects, lifespan shortening, radiation in detection and survey instruments, radiographic facilities design, quality assurance principles, resolution of radiation to patients, federal X-Ray standards. *Prereq.* RAD 4107.

RAD 4400 Anatomy of the Head and Neck (3 q.h.)

Explores anatomy of the head and neck in regional approach. Both standard and sectional anatomy are presented. Topics include brain, orbits, nasal cavity and paranasal sinuses, oral cavity and pharynx, larynx, thyroid and salivary glands, and angiology of head and neck.

RAD 4450 Computerized Body Tomography Pathology (3 q.h.)

Studies abnormal anatomy of the neck, thorax, abdomen, and pelvis as demonstrated by computed tomography. Appropriate correlations made to normal anatomic structure. *Prereq.* RAD 4304 or consent of instructor.

RAD 4460 Medical Imaging Quality Assurance (3 q.h.)

Establishing, conducting, and interpreting the results of a medical imaging quality assurance program are discussed. Covers basic imaging chain, film characteristics and sensitometry, test equipment and operation, data collection and interpretation. *Prereq.* RAD 4305 or equiv.

REAL ESTATE

RE 4301 Real Estate Fundamentals 1 (3 q.h.)
Introduction to the basic principles and terminology of real estate useful in various real estate business practices.

RE 4302 Real Estate Fundamentals 2 (3 q.h.)
Examines practices of real estate brokerage, including real estate appraisal, finance, development, management, and investment. Upon successful completion of RE 4301 and RE 4302, students may take the Massachusetts broker's or salesperson's examination. *Prereq.* RE 4301.

RE 4303 Real Estate Fundamentals (Intensive) (6 q.h.)
Same as RE 4301 and RE 4302.

RE 4304 Real Estate Fundamentals (Brokers) (4 q.h.)
Reviews the general principles and practices of real estate fundamentals. General prin-

ciples are examined with specific attention given to those areas of real estate that are tested on the Massachusetts broker's real estate examination. On successfully completing RE 4304, students are certified, which enables them to take the Massachusetts broker's exam. *Prereq.* RE 4302 or permission of instructor.

RE 4305 Real Estate Title Examination (3 q.h.)

Review of the general principles of abstracting and the function of the Registry of Deeds in the real estate business. General principles of title examinations are explored in detail, with attention given to recording deeds and the transfer of title in the conveyance of real estate. The function of the land court and registered land is also treated. Prepares the students for a possible career in title examination and may require field work in the form of activities to be performed at the Registry of Deeds.

RE 4323 Real Estate Appraisal 1 (3 q.h.)
Fundamental survey of the appraisal of single-family residences. Examines city or town neighborhood influences, site evaluation, building diagnosis, depreciation, the various approaches to value, and appraisal report preparation. The classroom hours in this course are recognized by the Massachusetts Board of Real Estate Appraisal Registration for the purposes of the new licensing and certification requirement. *Prereq.* RE 4302.

RE 4324 Real Estate Appraisal 2 (3 q.h.)
Specialized overview of the appraisal of income properties. Includes application of the cost, market, and income approaches to apartment buildings and other commercial and industrial properties and of the various methods of capitalization and residual techniques. The classroom hours in this course are recognized by the Massachusetts Board of Real Estate Appraisal Registration for the purposes of the new licensing and certification requirement. *Prereq.* RE 4323.

RE 4326 Appraising a Single-Family Dwelling (3 q.h.)
Fundamental survey of the appraisal of single-family dwellings for the beginning appraiser, real estate broker, salesperson, lender, assessor, or builder. Includes city and neighborhood analysis, site evaluation, building materials and cost, and depreciation. Also includes selected research into appropriate market data, assembling perti-

nent information, applying relevant analytical techniques, and preparing appraisal reports, including FNMA/FMAC report forms. The classroom hours in this course are recognized by the Massachusetts Board of Real Estate Appraisal Registration for the purposes of the new licensing and certification requirement.

RE 4327 Real Estate and Computer Analysis (3 q.h.)

This practical, step-by-step approach to the use of computers in the real estate business is strongly recommended for those students who plan to take Real Estate Appraisal 2 and is required for those students taking either Real Estate Financial Analysis 1 or Financial Analysis 2. The course involves a detailed analysis of computers in the financing of income properties. Students will be required to purchase a hand-held state-of-the-art computer with a solution workbook, the combined cost of which will be less than \$100. The computer will allow the students to examine and analyze proposed real estate investments and complicated appraisal assignments. The classroom hours in this course are recognized by the Massachusetts Board of Real Estate Appraisal Registration for the purposes of the new licensing and certification requirement. *Prereq.* RE 4302 or permission of instructor.

RE 4328 Real Estate Financial Analysis 1 (3 q.h.)

Analysis of how to critically examine and analyze any proposed real estate investment. Explores in detail the financial aspects of acquisition, ownership, and disposition, and considers taxation of investments, forms of property ownership (organization of the venture), analysis of operating statements, financial accounting, use of leverage, "tax-sheltered" investments, and special situations. Develops criteria of risk and return on investment (ROI) that should be established by various types of investors. Spreadsheets utilized. The classroom hours in this course are recognized by the Massachusetts Board of Real Estate Appraisal Registration for the purposes of the new licensing and certification requirement. *Prereq.* RE 4324 or instructor's permission.

RE 4329 Real Estate Financial Analysis 2 (3 q.h.)

Detailed analysis of the risks and rewards of real estate investments and problems in-

involved in financing income properties, using case studies, homework problems, and class discussion and debate. Stresses class participation. The classroom hours in this course are recognized by the Massachusetts Board of Real Estate Appraisal Registration for the purposes of the new licensing and certification requirement. *Prereq.* RE 4328.

RE 4330 Real Estate Financial Analysis (Intensive) (6 q.h.)

Same as RE 4328 and RE 4329. The classroom hours in this course are recognized by the Massachusetts Board of Real Estate Appraisal Registration for the purposes of the new licensing and certification requirement. *Prereq.* RE 4324.

RE 4340 Real Estate Development (3 q.h.)

Practical, step-by-step approach to the organization and development of a real estate project for the entrepreneur, banker, or broker. Includes the role of the developer, acquisition of land, site analysis, construction finance, gap financing and permanent commitments, project budgeting for capital costs and for income and expense, selection of professionals, negotiations of agreements with contractors and owners, and marketing the completed project. Case studies and guest lecturers may be featured. The classroom hours in this course are recognized by the Massachusetts Board of Real Estate Appraisal Registration for the purposes of the new licensing and certification requirement. *Prereq.* RE 4329 or instructor's permission.

RE 4341 Real Estate Law 1 (3 q.h.)

Covers private real estate law, including ownership rights in land, leasehold rights, and easements in the land of another; legal forms of ownership; the transfer and acquisition of title and of other interests; recording of deeds, leases, and other instruments; and the landlord-tenant relationship.

RE 4342 Real Estate Law 2 (3 q.h.)

Includes topics such as public real estate law, including government powers, rights, and controls on privately owned real estate; zoning and subdivision controls; conservation controls; taxation of real estate; rent controls; and eminent domain. *Prereq.* RE 4341.

RE 4344 Real Estate Management 1 (3 q.h.)

Prepares students for the practical problems of real estate management. Stresses the requisite day-to-day management of commercial, industrial, and residential properties as

well as the need for a management strategy relating to long-term property values. *Prereq.* RE 4302 or instructor's permission.

RE 4345 Real Estate Management 2 (3 q.h.)
Continuation of RE 4344. *Prereq.* RE 4344.

RE 4346 Real Estate Management 3 (3 q.h.)
Continuation of RE 4345. *Prereq.* RE 4345.

RE 4350 Buying Repossessed Real Estate (3 q.h.)

Introduction to the procedures and guidelines for dealing with government and institutionally foreclosed and repossessed property, emphasizing the hazards and opportunities of the process. Focuses on research techniques for finding, evaluating and financing published and unpublished repossessed commercial and residential for-sale property.

RE 4600 Honors Program 1 (4 q.h.)
Opportunity to undertake an in-depth research study project. See page 24 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

RE 4601 Honors Program 2 (4 q.h.)
See RE 4600.

RE 4602 Honors Program 3 (4 q.h.)
See RE 4600.

RE 4701 Independent Study 1 (3 q.h.)
Opportunity to undertake special research. See page 24 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

RE 4702 Independent Study 2 (3 q.h.)
See RE 4701.

RE 4703 Independent Study 3 (3 q.h.)
See RE 4701.

RE 4800 Advanced Tutorial 1 (3 q.h.)
Opportunity to take upper-level course independently. See page 23 for details. *Prereq.* 87 q.h.

RE 4801 Advanced Tutorial 2 (3 q.h.)
See RE 4800.

THERAPEUTIC RECREATION

REC 4101 Principles and Practices of Therapeutic Recreation 1 (3 q.h.)
Overview of the field, including rationale, history, philosophy, goals, treatment settings, problems of institutionalization, adjunctive therapies, and professional development.

REC 4102 Principles and Practices of Therapeutic Recreation 2 (3 q.h.)

Basic medical terminology with an overview of traumatic, sensory, neurological, orthopedic, and cardiovascular disabilities. Also includes prosthetics, orthotics, and an examination of attitudinal and societal barriers for the handicapped.

REC 4103 Principles and Practices of Therapeutic Recreation 3 (3 q.h.)

Integrated case-method and systems approach to planning with individuals and groups. Focus is on assessment; quality assurance; designing, charting, and understanding the fundamental elements of activities; current legislation; and standards of service.

REC 4104 Therapeutic Recreation Examination Review (3 q.h.)

Explores/reviews the basic theoretical and program aspects of Therapeutic Recreation Services. A major focus of this course is to update/upgrade practicing professionals with current trends in the profession to prepare them for the competency exam.

REC 4105 Childhood Medical Procedures (2 q.h.)

Explores emergency care/first aid and medical procedures for infants, children and adolescents who are in the care of professional parents in group homes, foster homes and day care facilities based on the practices of the American Red Cross and Standard of Care by Pediatricians. Prevention will be a major focus.

REC 4110 Group Dynamics and Leadership 1 (3 q.h.)

Emphasis on self-awareness, identity, and interpersonal and intergroup communications. Includes process factors influencing the need to join the group; motivation to participate; membership screening; size and purpose of the group; open-ended and closed approaches; group problem-solving; brainstorming; and conflict resolution.

REC 4111 Group Dynamics and Leadership 2 (3 q.h.)

Discussion of organization, development, and structure of groups; team building; role and value clarification; ramifications of change; group characteristics; and leadership styles and techniques. *Prereq.* REC 4110.

REC 4112 Group Dynamics and Leadership (Intensive) (6 q.h.)
Same as REC 4110 and REC 4111.

REC 4118 Coping Skills for Child Rearing (2 q.h.)

A basic introduction to understanding coping skills for those in a parenting role. A primary focus of this course is to introduce cognitive, behavioral, emotional and environmental changes. Lifestyle changes as well as various relaxation techniques will be presented.

REC 4210 Psychosocial Aspects of Illness and Disabilities (3 q.h.)

Exploration of relevant issues related to disability such as societal understanding of disability, handicapping conditions, adjustment, social networks, and the therapeutic use of self through a mixture of lectures, group discussion, guest speakers, and films. Examination of self in the role of change agents and care providers.

REC 4215 Causes/Detection of Child Abuse (2 q.h.)

Introduction to the causes of abuse in individuals and in society. Detailed description/definitions of domestic violence, child abuse, neglect and sexual abuse. Assessing treatment services and intervention strategies are introduced.

REC 4300 Arts and Crafts 1 (3 q.h.)

Overview of the creative media available for individual projects. Includes how to develop the technical capability to use a wide variety of materials in imaginative ways and the compilation of a personal arts and crafts manual as a reference tool. (*Laboratory fee.*)

REC 4301 Arts and Crafts 2 (3 q.h.)

Adaptation of creative skills to a therapeutic setting. Emphasizes continued development of technical capabilities and of instructional skills (one-to-one and group). Also discusses the planning, implementation, and integration of craft programs. (*Laboratory fee.*)

REC 4302 Arts and Crafts (Intensive) (6 q.h.)
Same as REC 4300 and REC 4301. (*Laboratory fee.*)

REC 4310 Social Recreation (3 q.h.)

Planning, organizing, and motivating for social and physical activities, including ice breakers, mixers, active motor and inactive games, joint projects, and special events geared to a variety of settings.

REC 4311 Therapeutic Use of Music 1 (3 q.h.)
Introduction to the field of music therapy, including an exploration of historical and current theories and various techniques used in clinical settings. Also includes a survey of the literature of therapy, covering special education and psychiatric and geriatric areas. Not open to students who have taken MUS 4160 or MUS 4161.

REC 4314 Therapeutic Use of Music 2 (formerly MUS 4161) (3 q.h.)

This course continues the exploration of the principles and practices of the therapeutic uses of music. It allows the student to use theoretic knowledge to create music therapy activities for a variety of client populations with an emphasis on psychiatric and geriatric care. *Prereq.* REC 4311.

REC 4350 Legal Issues of Disability and Rehabilitation (3 q.h.)

An analysis of significant legal issues pertaining to rehabilitation and disability in education, employment, and housing. Pertinent federal and state statutes covered.

REC 4378 Professional Caregiving 1 (formerly Parenting Skills 1) (3 q.h.)

Designed for both experienced and prospective parents/caregivers. It will reinforce and enhance methods that parents/caregivers have already developed to deal effectively with the care of children, adolescence and young adults. For those who feel less confident about their ability or experience, it will point the way to an effective, consistent, philosophical approach.

REC 4379 Professional Caregiving 2 (formerly Parenting Skills 2) (3 q.h.)

Designed to help parents/caregivers understand and differentiate between psychotic and neurotic behaviors, as well as to identify the symptoms of the unattached child. Specific techniques will be taught that will help the caregiver work successfully with the child, and in the case of the severely disturbed child, adolescent and adult, to be able to work as part of a therapeutic team in a treatment plan.

REC 4380 Professional Caregiving (Intensive) (formerly Parenting Skills Intensive) (6 q.h.)

Same as REC 4378 and REC 4379.

REC 4401 The Nursing Home Experience (3 q.h.)

This course explores the nursing home experience as well as additional long term/extended care facilities and their services and programs for the elderly. Therapeutic and activity based programs will be a focus as well as additional alternative living arrangements and services.

REC 4402 Leisure and Lifestyle (3 q.h.)

Focuses on aspects contributing to lifestyles and the role of leisure. Examines specific lifestyles through reading and video-taped materials. Gives students the opportunity to examine the impact of leisure on their own lifestyles and future aspirations.

REC 4403 Concepts of Leisure:

Sociopsychological Perspectives (3 q.h.)

Explores the various sociopsychological perspectives of leisure and the relations of mores, social structure, roles and values, and personality to leisure expression. Investigates other pertinent social and environmental factors that contribute to the phenomena of leisure.

REC 4425 Mental Illness and Retardation (3 q.h.)

Origins and manifestations of mental illness and retardation are discussed. Historical and contemporary overviews include discussions of treatment, settings, case studies, and trends.

REC 4460 The Process of Aging (3 q.h.)

Psychosocial dynamics of growing old, physical changes as a result of aging, the needs of people as they age, and attitudes toward work, retirement, and leisure are discussed. A study of dependency versus independence, remotivation, death and dying, and programs and services that add quality to a long life.

REC 4462 Leisure Counseling (3 q.h.)

Remedial and developmental process designed to produce behavior and attitude changes in the client's leisure patterns. Includes development of competence in identifying, using, and referring appropriate recreational resources. Compares leisure counseling fundamentals in a variety of recreational settings.

REC 4500 Clinical Internship 1 (4 q.h.)

Assigned field experience in a treatment facility under supervision of a certified professional. Students have the opportunity to learn

about the direct service application of classroom theory through observation and participation and written reports, evaluations, and seminars. *Prereq.* REC 4103 plus 12 q.h. of professional courses and consultant's permission.

REC 4501 Clinical Internship 2 (4 q.h.)

Continuation of REC 4500. *Prereq.* REC 4500.

REC 4502 Clinical Internship (Intensive) (8 q.h.)

Assigned clinical internship in a facility under the supervision of a certified Therapeutic Recreator (CTRS) professional. This clinical experience averages 36-40 hours per week for a minimum of 10 consecutive weeks at one agency totalling a minimum of 360 hours. This course meets the certifying requirement of the National Park and Recreation Association Certifying Board for the Therapeutic Recreator. *Prereq.* REC 4103 plus 12 q.h. of professional courses and/or the consultant's permission.

SPEECH - LANGUAGE PATHOLOGY AND AUDIOLOGY

SLA 4101 Introduction to Speech and Hearing (3 q.h.)

Offers an overview of disorders of speech and hearing and their treatment, and a review of normal speech and hearing development. Requires clinical observations of persons with speech, language, and hearing disorders.

SLA 4200 Speech and Hearing Science (3 q.h.)

Presents concepts and information related to the physics of sound and principles of psychophysics and audition. Introduces the anatomical and physiological basis of speech sound production and the acoustic analysis of speech. Examines current theories and research in speech reception, perception, and production.

SLA 4201 Anatomy and Physiology of Vocal Mechanisms (3 q.h.)

Offers an in-depth study of the static structure, musculature, and physiology of the speech mechanism. Emphasizes current research in speech physiology. *Prereq.* SLA 4101.

SLA 4300 Language Acquisition (3 q.h.)

Analyzes the emerging semantic and syntactical aspects of language in normal and atypical children. Discusses current theory and research in language acquisition. Requires clinical observations of children with normal and atypical language patterns.

SLA 4301 Phonetics and Developmental Phonology (3 q.h.)

Offers basic training in auditory recognition and symbolization of phonemes and allophones in major American dialects. Stresses static and dynamic articulatory descriptions. Also includes a review of the developmental sequences of phonemic. *Prereq. SLA 4101 and SLA 4201.*

SLA 4303 Introduction to Audiology (3 q.h.)

Focuses on the basic techniques of audiometric testing and hearing conservation, including a review of basic hearing sciences and a prepracticum and laboratory experience in hearing testing.

SLA 4403 Clinical Process in Speech and Language (3 q.h.)

Reviews principles and procedures of the functional analysis of behavior. Focuses on applying behavioral theory and research to speech, language, and hearing training. Emphasizes clinical investigation in the experimental analysis of behavior, and offers experience applying experimental procedures in assessing and treating people with communication disorders.

SLA 4460 Neurological Bases of Communication (3 q.h.)

Provides an opportunity to acquire an understanding of neuroanatomy and neurophysiology as they relate to normal aspects of speech, hearing, and language.

SOCIOLOGY-ANTHROPOLOGY

SOA 4100 Physical Anthropology (3 q.h.)

Introduction to elements of physical anthropology, covering such subjects as primates, fossil humans and evolution, problems of heredity and genetics, race and racial classifications. *Not open to students who have credit for SOC 4010.*

SOA 4101 Cultural Anthropology: Kinship Societies (formerly Preliterate Societies) (3 q.h.)

Introduction to sociocultural anthropology through the study of societies that have been called "tribal" or "primitive." Examines a range of contemporary societies that have no class structures, their social and cultural institutions, their subsistence strategies, and their efforts to remain independent people today.

SOA 4102 Cultural Anthropology: State Societies (formerly Industrial Societies) (3 q.h.)

Examines the social relations and cultural dynamics in peasant societies. Discusses the transformation of peasants into workers and the patterns of industrialization in the post-colonial world. Addresses issues of cultural diversity and social stratification in industrial societies.

SOA 4103 Anthropology Intensive A (6 q.h.)
Same as SOA 4100 and SOA 4101.**SOA 4104 Anthropology Intensive B (formerly Anthropology Intensive) (9 q.h.)**
Same as SOA 4100, SOA 4101, and SOA 4102.**SOA 4105 Anthropology Intensive C (6 q.h.)**
Same as SOA 4101 and SOA 4102.**SOA 4146 Peasant Societies in a Changing World (3 q.h.)**

Examines changes affecting traditional peasant cultures in the non-Western and Western worlds. Includes the processes occurring in situations involving culture contact, conquest, and colonialism.

SOA 4155 Individual and Culture (3 q.h.)
Focuses on cross-cultural comparisons of the socialization and acculturation of children and adults with respect to roles, values, and personality. Examines theories and methods used in psychological anthropology.**SOA 4160 Sex, Sex Roles, and the Family (3 q.h.)**

Analyzes popular and scientific notions about sex and the family by examining the social patterning of interactions in our culture, other cultures, and other species. Emphasizes the changing relationships between men and women.

SOA 4221 Culture and Medicine (3 q.h.)
Perspectives on medicine and health care are rapidly changing. As costs skyrocket, alter-

natives to "curative" medicine are being sought. Uses an anthropological perspective and draws on the vast amount of cross-cultural literature in exploring the impact of sociocultural factors on the incidence, definition, treatment, and prevention of illness as well as the organization of health services.

SOA 4266 Folklore (3 q.h.)

Focuses on Folklore, art, and song in various societies and how they are studied. Examines contemporary American materials.

SOA 4322 Culture Theory (3 q.h.)

What is culture? How do we explain cultural phenomena, including culture change? This course examines different classical and contemporary theories of culture: Boasian, functionalist, structuralist, marxist, post-structuralist, and postmodernist.

SOA 4430 Native North American Peoples (3 q.h.)

Past and present circumstances of a number of native North American peoples are explored.

SOA 4431 African Peoples and Cultures (3 q.h.)

Topics include African geography, prehistory, and culture; the spectrum of societal complexity ranging from Mbuti egalitarianism to Ashanti federation; and the problems of political, economic, and social change in contemporary Africa.

SOA 4434 Latin American Peoples and Cultures (3 q.h.)

Explores the processes of socioeconomic and cultural change in Latin America. Examines a selection of precolonial, colonial, and contemporary societies. For contemporary societies, the focus is on the relationship of local communities (peasant, worker, ethnic) to national cultures and global political and economic structures.

SOA 4470 Religion in Cross-Cultural Perspective (3 q.h.)

Comparative analysis of the rituals, beliefs, and religious institutions of various groups.

SOCIOLOGY

SOC 4010 Principles of Sociology 1 (4 q.h.)

Introduction to basic concepts and theories relating to the study of people as participants in group life. Emphasizes socialization, culture, social structure, primary groups, fam-

ily, social stratification, and population. *For Alternative Freshman-Year students only. Not open to students who have credit for SOC 4100 or SOC 4101.*

SOC 4011 Principles of Sociology 2 (4 q.h.)

Continuation of SOC 4010. Emphasizes critical analysis of American society with particular attention to problems of social, political, urban, and industrial change. *For Alternative Freshman-Year students only. Not open to students who have credit for SOC 4101 or SOC 4102. Prereq. SOC 4010 equiv.*

SOC 4100 Roles, Culture, and the Individual (formerly Fundamental Issues in Sociology) (3 q.h.)

Examines basic theoretical perspectives, research methods, and concepts of sociology, including society, status and role, socialization, and social groups. *Not open to students who have credit for SOC 4010.*

SOC 4101 Inequality and Institutions (formerly The Individual and Social Roles) (3 q.h.)

Examines how an individual's experience in society is shaped by cultural institutions and beliefs, and structures of interaction. Topics include patterns of deviance (crime, drugs), gender roles, and sexuality. *Not open to students who have credit for SOC 4010 or SOC 4011. Prereq. SOC 4100 or equiv.*

SOC 4102 Institutions and Social Change (formerly Critical Issues Facing Society) (3 q.h.)

Examines important social factors, including business and industry, population and ecology, science and technology, class, and race and ethnic relations. *Not open to students who have credit for SOC 4011. Prereq. SOC 4100 or equiv.*

SOC 4103 Introduction to Sociology Intensive A (formerly Sociology Intensive) (9 q.h.)

Same as SOC 4100, SOC 4101, and SOC 4102.

SOC 4104 Introduction to Sociology Intensive B (6 q.h.)

Same as SOC 4100 and SOC 4101.

SOC 4120 Sociology of Boston (3 q.h.)

The city is a laboratory for exploring the people's search for a lifestyle and the satisfaction of their needs. The city of Boston from the perspectives of environmental development, neighborhood and intergroup rela-

tions, institutional services, and symbolic meanings. Includes field trips with workbook and requires use of documentary and literary sources for term paper report. *Does not meet elective requirements for Sociology-Anthropology major.*

SOC 4125 Social Problems (3 q.h.)

Contemporary American social problems and the application of sociological concepts, methods, and principles to these problems are explored.

SOC 4147 Urban Life (formerly Urban Sociology) (3 q.h.)

Topics include various causes, characteristics, and effects of urbanization in several different cultures. Gives specific attention to the problem of urban and suburban living and the changing structure of the city.

SOC 4154 Sex and Gender Roles in Society (formerly Sex in Society: The Study of Sex Roles) (3 q.h.)

Explores historical and contemporary developments, examining the ways in which men's and women's changing roles are related to society at large.

SOC 4155 Family Relations (formerly Sociology of the Family) (3 q.h.)

Studies the family as a social institution in several selected cultures; family interrelations with political, economic, and educational institutions; and the changing nature of the family.

SOC 4156 Violence in the Family (formerly Sociology of the Family 2) (3 q.h.)

Examines physical, emotional, and sexual violence that occurs in families, emphasizing child and spouse abuse. Analyzes definitions, prevalence, causes, prevention, and treatment of specific cases of violence. Primary focus is on social and policy issues and problems of legal intervention.

SOC 4170 Race and Ethnic Relations (3 q.h.)

Focuses on relationships among various racial, national, cultural, and religious groups, emphasizing the development of black-white relationships in American society. Also covers the problems of contemporary minority peoples in American and other societies.

SOC 4175 Work and Professions (formerly Sociology of Work) (3 q.h.)

Explores the world of work, focusing on the development of occupational cultures, the nature of careers, and the meanings and im-

plications of professionalization. Students are encouraged to do a project on a career they are considering or one in which they have had practical experience.

SOC 4177 Gender in the Workplace (3 q.h.)

This course is designed to present an interdisciplinary exploration of issues related to gender differences and equality in the workplace. It is structured into three sections—theory, history, and policy—to provide real world and diverse perspectives on the subject. Topics to be discussed include women's voice, gender psychology, gender and historical analysis, race and gender, education and professionalism, comparable worth, the men's movement, the glass ceiling, leadership and management styles, among others.

SOC 4185 Deviant Behavior (formerly Sociology of Deviant Behavior) (3 q.h.)

Topics include a variety of social problems and their relation to the organization of society. Pays particular attention to alcoholism, sexual offenses, drug abuse, mental disorders, and other responses to conditions of urban industrial society.

SOC 4186 Social Control (3 q.h.)

Discusses group membership as a determinant of behavior, including analysis of status and role, patterns of authority, power, and group ideology as factors in the evaluation of conduct.

SOC 4190 Juvenile Delinquency (3 q.h.)

Emphasis on factors involved in juvenile delinquency and their implications for prevention, rehabilitation, and treatment.

SOC 4195 Drugs and Society (3 q.h.)

Introduction to the sociology of drugs. Examines social definitions of drugs, conditions of their use, and socialization into drug use. Considers deviant drug use and effects of social control on definitions and use. A range of licit and illicit drugs is considered.

SOC 4202 Sociology of Drinking (3 q.h.)

Exploration of how different groups and societies organize drinking as a social act, and the consequences of that organization. Covers the cultural meaning assigned to drinking, the social elements found in all drinking situations, how members of social groups learn how to drink, and the social and psychological functions of drinking.

SOC 4203 Sociology of AIDS (3 q.h.)

Studies the emergence of HIV and AIDS, the transmission of the disease, and the various effects of the disease on individuals. Also explores government and media reactions to AIDS, racism and homophobia in the public's response to AIDS, and the "moral status" of the disease.

SOC 4205 Law and Society (3 q.h.)

Topics include functions of law in modern society; legislation, litigation, and adjudication as social processes; the legal profession, the courts, and the administration of justice; laws and judicial decisions on controversial social issues; and laws regulating domestic, industrial, and other major social relationships.

SOC 4215 Medical Sociology (3 q.h.)

Examination of sociological concepts and research relating to patterns of behavior in the areas of health and disease. Emphasizes the family, community, medical organizations, class, and status as social subsystems related to the field of health.

SOC 4225 Social Gerontology (3 q.h.)

Analyzes issues and questions of aging, with special attention to social and economic consequences of the aging process, such as retirement and productivity, health care problems, nursing home residences, widower and widowhood, and the approach of death. Gives examples relating to aging in other cultures in a search for new answers to social problems of aging in the United States. Discusses how to anticipate, cope with, and even prevent problems of aging that concern self, family, and clients or patients.

SOC 4226 Work, Leisure and Aging (3 q.h.)

Includes discussion of theory and practice of leisure time activities as they relate to the older adult. Examines the social, cultural, and economic aspects of work, including housework, and the meaning of leisure. Explores various types of leisure activities and resources as well as how to build skills and design and implement activities.

SOC 4235 Death and Dying (3 q.h.)

Examines the treatment of death and dying, including problems faced by health care professionals, family members, institutions, the funeral industry, and the dying themselves. Covers cross-cultural perspectives, the social distribution of mortality, the changing

nature of death, and the ethical problems in determining life and death with particular attention to such issues as abortion, suicide, and ceasing medical intervention.

SOC 4240 Sociology of Human Service Organizations (3 q.h.)

Explores the contradiction between what human service organizations set out to do and what they actually accomplish. Includes how human service organization goals are defined, how clients become labeled, and the societal constraints placed on clients, workers, and the organizations.

SOC 4241 Human Services Professions (3 q.h.)

Covers human services, viewed from the perspectives of the recipient, the worker, and the society at large. Includes analysis of why they are needed, how agencies and programs have developed, and the basic skills, attitudes, values, and knowledge required of the human service worker today.

SOC 4245 Poverty and Inequality (formerly Sociology of Inequality) (3 q.h.)

Historical analysis of American class and ethnic differences, drawing on comparisons with other countries. Includes critical evaluation of sociological research and theories relating to the causes and effects of poverty and societal responses to it. Suitable for students in applied fields, such as nursing, criminal justice, education, allied health, pre-med, and pre-law.

SOC 4255 Sociology of Sport (3 q.h.)

Topics include games and sport from a sociological perspective, with particular reference to contemporary American society. Includes the role of play in modern society, the social organization of specific games and sports, and the relation of organized sport to the larger society.

SOC 4260 Introduction to Social Work Practice 1 (3 q.h.)

Explores the functions of the helping profession of social work, its settings and methods. Covers specific techniques, such as interviewing, history-taking, and recording skills.

SOC 4261 Introduction to Social Work Practice 2 (3 q.h.)

Continuation of SOC 4260 with particular attention to the functioning of social workers in selected settings. *Prereq.* SOC 4260 or equiv.

SOC 4262 Introduction to Social Work Practice 3 (3 q.h.)

Continuation of SOC 4261. Emphasizes enhancement of practice skills. *Prereq.* SOC 4261 or equiv.

SOC 4276 Popular Culture (3 q.h.)
(formerly Sociology of Popular Culture)

Significance of expressions of popular culture, such as film, television, music, and literature is explored. Examines media production, organization, technology, and audience consumption. Also covers the relationship between popular culture and existing socio-economic institutions.

SOC 4300 Social Theory 1 (3 q.h.)

Historical survey of sociological theorists, including the work of de Tocqueville, Comte, Marx, Durkheim, and Cooley. *Prereq.* Instructor's permission or 12 q.h. in Sociology-Anthropology.

SOC 4301 Social Theory 2 (3 q.h.)

Covers major theoretical issues in sociology. Discussion concentrates on systematic questions and topics rather than on particular theorists, but material is drawn from such theorists as Weber, Simmel, Thomas, Mannheim, Merton, and Parsons. *Prereq.* SOC 4300 or equiv.

SOC 4302 Social Theory 3 (3 q.h.)

Seminar focuses on questions of theoretical interest, such as the problem of order, the problem of change, and the role of the individual in change. Students present papers in class. *Prereq.* SOC 4301 or equiv.

SOC 4303 Social Theory (Intensive) (9 q.h.)

Same as SOC 4300, SOC 4301 and SOC 4302. *Prereq.* Instructor's permission or 12 q.h. in Sociology-Anthropology. Not open to students who have credit for SOC 4300, SOC 4301, or SOC 4302.

SOC 4310 Class, Power, and Social Change (3 q.h.)

Discusses theories of social equality and inequality as applied to the exercise of power and to the growth and development of social movements and group conflict. Takes a large-scale, social-change point of view.

SOC 4331 Social Research Methods 1: Generating and Investigating Research Problems (3 q.h.)

Examines methods for gaining knowledge through social research. Emphasizes the

practical aspects of research, such as the problems sociologists face in doing research and how they have been solved. Students are required to design a small study.

SOC 4332 Social Research Methods 2: Tabulating and Analyzing Social Data (3 q.h.)

Covers methods of tabulating, presenting, summarizing, and analyzing data, including elementary descriptive and inferential statistics and how to use them. Emphasizes statistics as a tool and introduces the use of the computer. *Prereq.* SOC 4331 or equiv.

SOC 4333 Social Research Methods 3: Doing Social Research (3 q.h.)

Students carry out the study they designed in SOC 4332, analyze data, and report results. Includes the ethics and politics of social research and the interrelationship of social action, social research, and theory building. *Prereq.* SOC 4332 or equiv.

SOC 4805 Field Work in Sociology (6 q.h.)

Designed to enhance career development by allowing students to earn credit for the application of their academic backgrounds to practical problems in the workplace. See page 23 for details. *Prereq.* completion of 15 q.h. in Sociology and Program Director's approval.

SOC 4815 Advanced Tutorial 1 (3 q.h.)

Opportunity to take an upper-level course independently. See page 23 for details. *Prereq.* 87 q.h.

SOC 4816 Advanced Tutorial 2 (3 q.h.)

See SOC 4815.

SOC 4820 Honors Program 1 (4 q.h.)

Opportunity to undertake an in-depth research study project. See page 24 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

SOC 4821 Honors Program 2 (4 q.h.)

See SOC 4820.

SOC 4822 Honors Program 3 (4 q.h.)

See SOC 4820.

SOC 4830 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 24 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

SOC 4831 Independent Study 2 (3 q.h.)

See SOC 4830.

SOC 4832 Independent Study 3 (3 q.h.)

See SOC 4830.

SOC 5225 Social Gerontology (3 CEUs)
Same as SOC 4225.

SOC 5226 Work, Leisure, and Aging (3 CEUs)
Same as SOC 4226.

SOC 5240 Sociology of Human Service Organizations (3 CEUs)
Same as SOC 4240.

TECHNICAL COMMUNICATIONS

TCC 4030 Word Processing: Theory, Practice, and Integration (formerly Word Processing: A Comprehensive Overview) (2 q.h.)

Offers students an opportunity to examine critically various word processing programs and the theories behind them, defining word processing and its objectives from the standpoint of both developer and end-user. Covers the history of word processing, explores strengths and weaknesses of current programs, and looks to the future of word processing as it relates to desktop publishing, hypertext media, and related developments in the technical community.

TCC 4101 Technical Writing 1 (3 q.h.)

Introduction to basic technical writing skills, emphasizing selecting and organizing data. Includes audience analysis, research techniques, and descriptions of objects, mechanisms, and processes. Provides practice in descriptive writing, classification and definition, paragraphing, and preparing technical documentation outlines. Includes frequent technical writing exercises and projects applicable to both software and hardware writing tasks. *A writing proficiency test is given at the first class meeting.*

TCC 4102 Technical Writing 2 (3 q.h.)

Application of the information gathering, organizational, and technical writing skills acquired in TCC 4101 to more advanced projects. Extensive practice in formatting, organizing, writing, and editing technical reports. *Prereq. TCC 4101.*

TCC 4103 Technical Writing (Intensive) (6 q.h.)

Same as TCC 4101 and TCC 4102. *A writing proficiency test is given at the first class meeting.*

TCC 4105 Editing for Science and Technology (3 q.h.)

Covers fundamentals of editing as they apply to scientific, technical, and engineering

writing. Examines the role of the editor in business, industry, and the sciences; basic editorial services such as proofreading, copy and content editing, production editing, and project editing; analysis and critique of manuscripts; work with authors; the editor as writer and interviewer; and science interpretation and technical translation. Accelerated work for students already skilled in spelling and grammar. *Prereq. TCC 4101 or instructor's permission.*

TCC 4106 Advanced Editing for Science and Technology (3 q.h.)

Continuation of TCC 4105. *Prereq. TCC 4105.*

TCC 4110 Technical-Promotional Writing (3 q.h.)

Explores structure, style, and graphic presentation of technical-promotional writing in a high-tech environment. Students are trained to combine technical knowledge and writing skills in developing quality technical brochures, articles, product catalogs, demonstration kits, slide presentations, and video scripts. *Prereq. TCC 4101, TCC 4102, or instructor's permission.*

TCC 4301 Computer Software Technical Writing 1 (3 q.h.)

Introduction to the tasks and problems unique to software technical writing. Includes review of fundamental software concepts, the role and importance of software documentation, component parts of software technical manuals and their purposes, tutorial and reference functions of manuals, research tools for manual writing, and the writing process itself. *Prereq. TCC 4101 and MIS 4102 or instructor's permission.*

TCC 4302 Computer Software Technical Writing 2 (3 q.h.)

Continuation of TCC 4301. *Prereq. TCC 4301.*

TCC 4303 Seminar in Software Technical Writing (3 q.h.)

An advanced case-study seminar on contemporary problems in technical writing for the working or prospective writing professional. Emphasizes integrating the viewpoint of the software developer with the task-oriented needs of the end-user. Includes system manual design; computer design; modularity; and system evolution. *Prereq. TCC 4302 or instructor's permission.*

TCC 4304 Computer Software Technical Writing (Intensive) (6 q.h.)
Same as TCC 4301 and 4302. *Prereq.* TCC 4101 and MIS 4102 or instructor's permission.

TCC 4311 Instruction Manual Writing 1 (formerly Hardware Technical Manual Writing 1) (3 q.h.)
Introduction to the fundamentals of technical manual writing, including the theory and practice of manual design, organization, and content. Covers copyright law, product liability, graphic design, readability, manual specifications and standards, illustrations, and reproduction techniques. Emphasizes hardware operations manuals. Includes individual and class design and writing projects. *Prereq.* TCC 4101 and TCC 4102.

TCC 4312 Instruction Manual Writing 2 (formerly Hardware Technical Manual Writing 2) (3 q.h.)
Application of skills acquired in TCC 4311 to an entry-level technical manual writing project. Students elect individual or group writing and production projects for high-technology equipment or systems lacking adequate documentation. Includes instruction in writing safe, legible operating instructions and descriptions of installation procedures, principles of operation, and maintenance. Also covers manual changes and updates. *Prereq.* TCC 4311 or instructor's permission.

TCC 4313 Instruction Manual Writing Intensive (6 q.h.)
Same as TCC 4311 and TCC 4312. *Prereq.* TCC 4101 and TCC 4102.

TCC 4320 Proposal Writing (3 q.h.)
Background in the preparation of proposals, including how to analyze a request for proposal or bid set. Introduces the various types of proposals generated by industry and provides an opportunity to prepare a proposal in a simulated situation, through role playing and participation on a proposal preparation team. Includes considerable analysis and writing practice. *Prereq.* TCC 4102 or instructor's permission.

TCC 4330 The Business and Technical Presentation (3 q.h.)
Application of the principles of technical communication to audiovisual presentations. Includes audience analysis, techniques of organization, script preparation, media selection, the design and production of visuals,

the influence of physical factors on communication, and the elements of effective delivery. Participants prepare and deliver presentations and receive video playback and peer critiques.

TCC 4335 Introduction to Hypertext Development (3 q.h.)
Designed to give students essential background in developing field of hypertext. Topics include theory and practice, authoring systems, hypermedia topologies and user navigation, hypermedia path mechanisms, and hypertext-based writing tools. *Prereq.* TCC 4101 and 4102.

TCC 4336 Medical Writing (3 q.h.)
Focuses on the scope of medical communications, the role of technology and the medical communicator, patient education, clinical trial reporting, technical/legal issues such as FDA and UL approvals, pharmaceutical writing, and medical editing. *Prereq.* TCC 4101 and 4102.

TCC 4337 Writing for the Biotechnology Industry (3 q.h.)
Examines technical communication in the field of biotechnology, including the areas of health care, agriculture, and industrial "bioprocessing." Explores the role of the biotechnology technical communicator in areas such as marketing and business communication. Covers documentation common in the research, development, and marketing of new products. Provides practice in structuring information into formats such as research articles, development proposals, protocols and instructions, and technical briefings with emphasis on audience analysis as well as content and purpose. Introduces stylistic conventions standard in the life sciences. Integrates documentation planning and project management into the product development cycle.

TCC 4340 Documentation Development and Completion (formerly Technical Writing Portfolio Development) (3 q.h.)
In this final course before graduation, students apply organizational and communications skills acquired in the technical writing program. Each student is responsible for finding a "real-world" product that needs technical documentation. Working with the instructor, the student then develops the documentation from an initial outline to a final completed manual that will be used with the product. (*Not a regularly scheduled*

course. Students must contact Liberal Arts Office to register to work with an instructor.)

TCC 4350 Concepts of Modern Technology 1
(3 q.h.)

Surveys applications of physical science to mechanical devices and introduces the laws of thermodynamics. Considers the influence of material properties on design and manufacturing techniques. *Prereq.* MTH 4006 or equiv.

TCC 4351 Concepts of Modern Technology 2
(3 q.h.)

Surveys applications of physical science to electrical and electronic devices and introduces electronic circuit design. Includes a comparison of various devices used for amplification and control, and a study of the development of the electronic digital computer and the components involved in the manufacture of computers. *Prereq.* TCC 4350.

TCC 4802 Advanced Tutorial 1 (3 q.h.)

Opportunity to take an upper-level course independently. See page 23 for details. *Prereq.* 87 q.h.

TCC 4803 Advanced Tutorial 2 (3 q.h.)

See TCC 4802.

TCC 4805 Field Work in Technical Communications (6 q.h.)

Designed to enhance career development by allowing students to earn credit for the application of their academic backgrounds to practical problems in the workplace. See page 23 for details. *Prereq.* completion of 18 q.h. in *Technical Communications* and Program Director's approval.

TRANSPORTATION

TRN 4301 Elements of Transportation 1
(3 q.h.)

Introduction to regulatory, economic, and management aspects of transportation. Covers concerns of shipping industry, government, and carriers. Includes history of cost, rate-making, operations, entry, mergers, and intercity passenger and cargo carriage. Essential to students in business, law, or government.

TRN 4302 Physical Distribution Management 1 (3 q.h.)

Introduction to the physical distribution management concept. Studies time and place

utility of manufactured products. Includes customer service and profitability requirements: getting merchandise to the customer at the right time, place, and in the right condition. Covers transportation alternatives, inventory control, warehousing, cost control, and location strategy. Contemporary texts and case methods are used.

TRN 4303 Elements of Transportation 2
(3 q.h.)

Continuation of TRN 4301. Examines new thrust of lower costs, including contracting and negotiating for carrier service that has resulted from deregulation. *Prereq.* TRN 4301.

TRN 4304 Physical Distribution Management 2 (3 q.h.)

Continuation of TRN 4302. Analytical skills developed through presentation of problems and cases. *Prereq.* TRN 4302.

TRN 4305 Traffic Management 1: Rates and Tariffs (3 q.h.)

Includes the interpretation and use of tariffs. Examines classifications, rate scales, tariff rules, rate-making procedures, and ICC law and practice. *Prereq.* TRN 4301.

TRN 4306 Traffic Management 2: Selected Topics (3 q.h.)

Further study of traffic management, covering such topics as routing, claims, insurance, consolidation, and packaging. *Prereq.* TRN 4305.

TRN 4308 Corporate Travel Management 1
(3 q.h.)

This course introduces the student to the basic aspects of corporate travel management. Topics include the travel management environment, role of the travel manager, and business ethics and legal aspects of travel management. Also covered are corporate travel planning, understanding business travelers' needs, conference planning, travel industry operations, and travel aspects of conference planning.

TRN 4309 Corporate Travel Management 2
(3 q.h.)

This course expands upon areas covered in TRN 4308. Topics include negotiating travel arrangements, budget and fiscal aspects of travel management, travel management marketing, using corporate resources to support travel management, developing and managing corporate travel policy, managing corporate travel policy compliance, and fu-

ture trends in passenger transportation. *Prereq.* TRN 4308.

TRN 4316 Carrier Management (3 q.h.)

Explores the transportation system from the carrier viewpoint. Covers managerial response to a heavily regulated and rapidly expanding environment. Includes carrier decision-making involving routes, scheduling, financing, and pricing of services.

TRN 4321 Transportation Negotiations (3 q.h.)

Principle elements of transportation regulation, public policy, and the role of federal and state regulatory agencies are covered. Includes types of commerce, carriers, and services subject to changing regulation, entry and exit requirements, economic and cost considerations, and selective rate and tariff construction rules. Examines industry practices covering performance, requirements, liabilities, and responsibilities of shippers, regulated carriers, and exempt forms of transportation. Discusses rules and procedures established by the ICC and Massachusetts DPU. *Prereq.* TRN 4301.

TRN 4323 Transportation of Hazardous Materials (3 q.h.)

This course provides the student with an awareness of the various aspects of transporting hazardous materials. The course identifies the role of the various regulatory agencies, the applicable regulations, the necessary documentation, training requirements, emergency response requirements, and basic roles and definition as they relate to the transportation of hazardous materials.

TRN 4325 Management of Warehouse Operations (3 q.h.)

Management of warehouses is analyzed. Includes site selection, construction, finance, operations, measurement of performance, and warehouse technology.

TRN 4334 Private Trucking (3 q.h.)

Explores the formation of a private trucking operation from a management focus. Includes legal guidelines, purchase versus lease, operations, and performance measurement.

TRN 4340 Air Transportation (3 q.h.)

Topics include economics and regulation of air carriage certified by the Civil Aeronautics Board. Includes entry, operations, pricing, mergers, cost analysis, and financing.

TRN 4341 Commuter Transportation (3 q.h.)
Examines the scope and status of transportation in the metropolitan area. Includes planning and financing urban transportation systems, the role of local, state, and federal government units, and the problems of transit management.

TRN 4342 Transportation Loss, Damage and Other Claims (3 q.h.)

Covers rules, regulations, and other pertinent elements of transportation claims resulting from the loss or damage of cargo, overcharges and undercharges, and related carrier and shipper activities.

TRN 4350 International Transportation and Distribution Management (3 q.h.)

Examines the safe and efficient overseas transportation of products by air or water. Covers major indirect supporting business and agencies involved in the international movement of people and goods.

TRN 4600 Honors Program 1 (4 q.h.)

Opportunity to undertake an in-depth research study project. See page 24 for details. *Prereq.* 96 q.h., 3.5 q.p.a.

TRN 4601 Honors Program 2 (4 q.h.)

See TRN 4600.

TRN 4602 Honors Program 3 (4 q.h.)

See TRN 4600.

TRN 4701 Independent Study 1 (3 q.h.)

Opportunity to undertake special research. See page 24 for details. *Prereq.* 96 q.h., 3.0 q.p.a.

TRN 4702 Independent Study 2 (3 q.h.)

See TRN 4701.

TRN 4703 Independent Study 3 (3 q.h.)

See TRN 4701.

TRN 4800 Advanced Tutorial 1 (3 q.h.)

Opportunity to take upper-level course independently. See page 23 for details. *Prereq.* 87 q.h.

TRN 4801 Advanced Tutorial 2 (3 q.h.)

See TRN 4800.

TRN 4900 Fieldwork (6 q.h.)

Opportunity to enhance career development by applying academic background to practical problems in the workplace. See page 23 for details. *Prereq.* Approval of Program Director.

Tuition and Fees

Tuition

Tuition for all credit courses is \$140 per quarter hour of credit. Checks and drafts for all charges are to be made to the order of Northeastern University. Charges for registration and tuition for special courses are at the rate specified for each course, with the exception of drama and nontutorial courses. There is no reduction in fees for auditing courses.

Noncredit courses are charged at quarter-hour rates comparable to those of credit courses meeting on an equivalent contact-hour schedule.

Students are not permitted to attend class sessions or take any examination or test until they have paid their tuition fees or have made satisfactory arrangements for payment.

It is the student's responsibility to ensure that all tuition charges and fees are paid when due. If a bill has not been received prior to the start of classes each quarter, the student should come in person to the Bursar's Office, where a bill will be processed.

Any discrepancies in billing should be immediately brought to the attention of the Bursar's Office. If there is a billing problem, the undisputed portion of the bill should be paid on time to avoid any additional late fees. Failure to receive a bill through the mail or to pay the undisputed portion of the bill is not justification for late payment of amounts actually owed.

Students will not be advanced in class standing or permitted to re-enroll in the University nor will degrees be conferred until all financial obligations to the University have been met.

Tuition for Courses in Other Northeastern Departments or Colleges

University College students assigned to courses in other departments or colleges of the University are charged the tuition fees effective in the departments or colleges in which they are enrolled.

Initial Registration Fee

A nonrefundable \$10 registration fee for first-time University College students is billed with tuition fees.

Tuition Budget Payment Plans

Occasionally situations develop—usually beyond the control of the student—that make it difficult to meet the payments in the manner outlined above. Under such circumstances, the student is advised to contact the Bursar's Office to arrange for deferred payment. The only deferred payment plan offered is as follows and applies only to the amount owed for the current quarter:

First payment	1/3 due first week of quarter
Second payment	1/3 due fourth week of quarter
Balance	1/3 due eighth week of quarter

Such arrangements should be made before the end of the first week of the quarter or within one week of the date of registration if the student enters late. Deferred payment of tuition entails a fee of \$10, which is levied on all accounts not paid by the end of the second week of classes. Failure to take immediate action will result in a late payment fee of \$75.

Tuition Underwritten by Employers

An increasing number of companies are underwriting part or all of the cost of tuition of students in their employ. In cases where payment is to be made directly by the employer to the University, the student should furnish the Bursar's Office with a purchase order covering registration or a statement from an officer of the company certifying that the company is underwriting the tuition. In cases where students are being reimbursed by their employer, tuition must be paid by the student according to the prescribed regulations to avoid late payment charges.

Veterans' Benefits

Any veteran covered by Public Law 89-358 should report to 126 Hayden Hall to fill out the proper enrollment forms.

Late Payment Fee

Bills for tuition and fees are payable in accordance with the due date shown. A late payment fee of \$75 is charged for failure to make payments in accordance with the prescribed regulations.

Refund of Tuition

The general policy in all schools and colleges of the University with respect to refunds of tuition is as follows: the University provides all instruction on an academic-quarter basis, for which students pay at the beginning of each quarter. Tuition refunds are granted through the first four weeks of a quarter only when specific conditions are met and are granted only on the basis of the date appearing on the official withdrawal application when filed with the Registrar in 120 Hayden Hall. Nonattendance does not constitute official withdrawal. Questions regarding refunds should be discussed with the Bursar.

Refunds are granted in accordance with the following schedule:

Official withdrawal filed within	% of tuition credited
First week of quarter	100%
Second week of quarter	75%
Third week of quarter	50%
Fourth week of quarter	25%

New Low Rate for Intensives

University College offers a selection of six-quarter-hour courses at the Boston, Burlington, and Dedham campuses. Intensives running on Friday evenings and Saturdays will be offered at a special reduced tuition rate of \$640 (\$200 less than the normal tuition). Intensives running Mondays through Thursdays will be offered at the special reduced rate of \$740 (\$100 less than the normal tuition). Check the current *Schedule Guide* for a list of these courses.

Default Policy

In cases where the student defaults on his/her tuition payments, the student shall be liable for not only the outstanding tuition, but also for reasonable collection costs and attorneys' fees incurred by the University in collecting unpaid tuition.

Fees

Student Center Fee

All students in University College on the Huntington Avenue campus are charged \$8.25 each quarter for the services available in the Student Center.

Laboratory Fees

Students enrolled in courses that carry a laboratory fee must purchase a Laboratory Fee and Deposit Card from the Cashier's Office (\$15 for extra cards).

A fee of \$45 is charged for biology courses. For chemistry courses, cards cost \$60 per quarter with the possibility of a \$5 refund at the end of the quarter, depending on breakage. Upon completion of the course or withdrawal during the quarter, the student must check his or her status with the laboratory attendant. The Cashier's Office will then refund any unused balance shown on the card.

Other fees include:

Arts and Crafts Lab	\$25.00	Film Courses	\$25.00
Art Studio Courses	\$35.00	Food Prep Courses	\$25.00
Computer Graphics Lab	\$35.00	Media Studio Lab	\$35.00
EMT/Paramedic Lab	\$25.00	Medical Lab/Science Lab	\$35.00
		Radiology Lab	\$25.00

Special Rates

Nursing courses and the EMT Basic course are offered at special rates. Please consult the current *Schedule Guide* for those fees.

Music students enrolled in music instruction pay a special rate. For details contact Marjorie Atlas, University College Music Coordinator, 351 Ryder Hall, telephone 617-373-2440 or 617-373-2442.

Mandatory Medical Insurance Fee

All Northeastern University students who are either classified as full-time or who are in a degree program carrying a courseload of 9 credits or more are required by law to be covered by medical insurance. You will be enrolled automatically in the University's plan at a \$525.00 charge to your Northeastern account. Or, if you are covered by comparable medical insurance, you may waive the university's plan. Northeastern University medical insurance waiver forms are available at the Bursar's Office, 254 Richards Hall, 617-373-2270.

Missed Final Examination Fee

Students absent from the regularly scheduled final examination at the end of a course may petition for a missed final examination. The fee for each examination requested by the student is \$50. The fee must be paid when the petition is filed in the Office of Academic and Student Affairs.

Transcripts

Students may request official transcripts of their grades at the Registrar's Office. There is a charge of \$2 per copy, payable in advance. Unofficial transcripts are issued free of charge.

Financial Aid

The Office of Financial Aid, located at 356 Richards Hall, offers several types of assistance to part-time and full-time University College students. All awards are based on financial need. Aid granted from programs sponsored by the federal or state government is dependent upon the amount of funding allocated to Northeastern University. Federal regulations require that students who receive financial aid funds be United States citizens or permanent residents.

Application Procedure

All student applying for aid must submit a Free Application for Federal Student Aid (FAFSA) to the College Scholarship Service. The College Scholarship Service is an agency which collects financial data from students and distributes that data to schools, state agencies, and the Federal Pell Grant program. Upon receipt of the FAFSA, the College Scholarship Service will send the student a Student Aid Report (SAR).

Federal regulations require that students submit a Financial Aid Transcript (FAT) from each school they have previously attended to the Office of Financial Aid at Northeastern University before they can receive financial aid at Northeastern. This is required even if you did not receive aid at the other institution(s). If your transcript indicates you are in default on a loan or you owe a refund, you will be ineligible for all types of financial aid until this status is cleared.

Northeastern University also requires its students to complete an Institutional Application. The Institutional Application will provide your counselor with additional information that is not on the FAFSA.

All application materials are available at the Office of Financial Aid. Students should begin the application procedure at least twelve weeks before the start of the quarter in which they plan to enroll. Students must apply for financial aid each academic year.

In order to be eligible for financial aid, students must be admitted into a degree program prior to the beginning of the academic quarter. Students admitted after the start of the quarter will not be eligible for aid until the next academic quarter. Students not yet admitted into a degree program are advised to contact the University College Office of Academic and Student Affairs, 180 Ryder Hall.

Satisfactory Academic Progress

For all students who are receiving financial aid for the first time on or after July 1, 1987, satisfactory academic progress will be determined based on having achieved a 2.0 QPA after the completion of the second grade level and maintaining that minimum until completion of the degree. Students not achieving a 2.0 QPA or dropping below that minimum after their second grade level will not, by Federal law, be eligible for financial aid.

Financial Aid Programs

Financial aid to students is offered in the form of loans and grants. The following programs are available:

• Federal Pell Grants

Based on a student's financial information, a student may be eligible for a Federal Pell Grant. The Federal Pell Grant Program is a federal aid program designed to provide financial assistance to undergraduate degree candidates. Approximately six weeks after a student has filed the FAF, the Federal Pell Grant Processor will send the student a Student Aid Report (SAR). If a student is eligible for a Federal Pell Grant, the SAR must be submitted to the Office of Financial Aid.

This program requires a student to be admitted into a degree program and be enrolled in at least 6 quarter hours per quarter. If eligible for a Federal Pell Grant, the amount of the grant will vary depending upon the number of quarter hours a student enrolls in each quarter. If a student's enrollment is less than 6 quarter hours during a quarter, the Pell Grant will be cancelled for that quarter. Students with a prior bachelor's degree are not eligible to receive Pell Grants.

• Federal Stafford Student Loan Program

The Federal Stafford Student Loan Program enables a student to borrow a maximum of \$2,625 during the freshman academic year, \$3,500 during the sophomore year, and \$5,500 for subsequent years from a participating bank or other financial institution. The federal government pays the interest while the student is in school. This loan must be repaid. The legal maximum loan limit for undergraduate students is \$23,000.

Eligibility to participate in the Federal Stafford Student Loan Program is based on need in accordance with federal regulations. Students must be admitted into a degree program and enrolled in at least a half-time (6 quarter hours per quarter) basis in order to be eligible for this loan.

In order to have a loan processed by the Financial Aid Office, a student must have a complete financial aid application on file, have received a letter of eligibility from our office, and have submitted a Federal Stafford Student Loan Application. Applications for the loan are available from local lending institutions and the Office of Financial Aid.

Repayment of the loan usually begins six months after a student withdraws, graduates from an educational institution, or ceases to carry at least a half-time course load. The repayment period may be as long as ten years. The amount of the payments depends upon the size of the debt, but must be at least \$50 per month.

Repayment on loans may be deferred under certain circumstances. For details, contact your lender.

Students who borrow funds through this program must report any of the following changes to their lenders:

- withdrawal from school;
- transfer to another school;
- reduction of course load to less than half time;
- change of address or parents' address; and
- change of name.

Additional information about financial aid is available from the Office of Financial Aid, 356 Richards Hall, 617-373-3190.

All federal financial aid programs are subject to change depending on adequate and continuing federal support.

• State Scholarships

Eligibility for state scholarships is based on need and is determined by the Scholarship Office in each state. If you completed a FAFSA, you will receive a separate letter from your State Scholarship Office notifying you of your eligibility. In order to be eligible for a state scholarship, a student must be admitted into a degree program and enrolled in at least 12 quarter hours per quarter for 2 quarters during the academic year. A student with a prior bachelor's degree is not eligible to receive a state scholarship. Contact your State Scholarship Office for more information.

Scholarships

The following University College and School of Engineering Technology scholarships and awards are available to students who have been accepted as degree candidates and are in good academic standing.

Scholarships are awarded once a year by the Scholarship Committee. Final selection of scholarship recipients is usually made in late May, followed by the awarding of the scholarships in late June or early July. Funds are usually applied to tuition expenses for the following academic year. Awards range in amount from \$300 to \$1,000.

Application Procedure

In January, a mailing list of students who have requested applications is prepared and applications are mailed out with the stipulation that they be completed and returned to the Office of the Dean by March 31. A student can be placed on the January mailing list by calling 617-373-2400 or TTY 617-373-2825 and leaving his or her name, address, and student ID number with the receptionist.

Dean Kenneth W. Ballou Family Scholarship Fund

The Dean Kenneth W. Ballou Family Scholarship Fund was established in 1986 by the generosity of the Kenneth W. Ballou family. Dean Ballou served Northeastern University in various capacities from 1957 to 1978, including as Director of Undergraduate Admissions, Dean of University Relations, Assistant to the President, Dean of Adult Education Programs, and Dean of University College. This scholarship is awarded annually to a University College student(s) who demonstrates financial need, academic promise, and leadership potential.

James A. Buczel Memorial Scholarship

This scholarship was established in 1988 in memory of James A. Buczel, who received his Associate in Science degree in 1978. The endowment funds were provided by the family, friends, and associates of Mr. Buczel who was a member of the U.S. Customs Service of the Department of the Treasury. He lost his life in the line of duty while inspecting cargoes on Sunday, October 9, 1988 in New Haven, Connecticut. The income from this memorial scholarship fund is to be awarded to undergraduate students in University College who are majoring in Law Enforcement and demonstrate financial need, academic promise, and soundness of character.

Dorothy G. Cooley Scholarship

This scholarship was established in 1988 by Dorothy G. Cooley, a 1960 graduate of the evening division of The School of Business, now University College. The income from this fund is to be awarded to responsible women students who are candidates for a bachelor's degree and who have demonstrated soundness of character and who have above average scholastic ability.

Henry J. Doherty Memorial Scholarship

The Henry J. Doherty Memorial Scholarship Fund was established in 1987 through the generosity of Doris R. Doherty, as a tribute to her late husband, a 1953 graduate of the Evening School of Business and a successful business leader in the field of legal publishing. The income from the scholarship is awarded annually to deserving students with demonstrated financial need who are pursuing part-time evening study and have been accepted as degree candidates.

Electronics Industries Personnel Association Scholarship

This scholarship was established in 1980 through the generosity of the Electronics Industries Personnel Association. The income is awarded annually to one or more students whose studies, to a significant extent, are in the field of human resources management at University College. Recipients shall demonstrate financial need, soundness of character, and academic stability.

Howard W. Evirs, Jr. Scholarship

This scholarship fund was established in 1991 by Howard W. Evirs, Jr., a graduate of the College of Engineering, Class of 1951, and the Graduate School of Business, Class of 1970.

It is Mr. Evirs' desire to provide financial assistance to a single parent, preferably a female, enrolled in any full-time or part-time baccalaureate program of the University who has demonstrable financial need and proven academic excellence. The income from the scholarship fund which is administered by the Financial Aid Office will be awarded annually.

Students should apply to Northeastern University/Office of Financial Aid, 356 Richards Hall, Boston, MA 02115 regarding the above scholarship.

Vincent A. Forte Memorial Scholarship

This scholarship was established in 1985 in memory of Vincent A. Forte, a graduate of Northeastern University. The endowment funds were provided through the generosity of his family, friends, and associates. Forte was an ambitious student pursuing a full-time business career while attending school part-time. He received an associate's degree from Lincoln Institute in 1957, a Bachelor of Business Administration degree in 1958, and a Master of Business Administration degree in 1967. The income from this fund is awarded to undergraduate students in University College who are pursuing a bachelor's degree in business, who demonstrate financial need, and who are maintaining a cumulative quality-point average of 3.0 or better after completing at least 44 quarter hours of credit.

Chester W. Higgins Memorial Scholarship

The Chester W. Higgins Memorial Scholarship was established in 1991 by the generosity of Mrs. Marion Higgins, as a tribute to her late husband. Chester (Chet) Higgins was a senior lecturer in the Business Administration program of University College for almost forty years. He also served as President of the Faculty Society and was instrumental in establishing the Faculty Society Memorial Scholarship program to benefit part-time students. To be eligible for this award a student should be majoring in management in University College and should demonstrate financial need, academic promise and soundness of character.

Kappa Tau Scholarships

The Kappa Tau Phi Sorority Scholarship Fund annually makes scholarship awards available to women students in the science, business, engineering, and liberal arts programs who rank highest at the end of the upper-middle year. In the event that the chosen student is eligible for an award of greater monetary value, the award is made to the next highest-ranking woman student. To be eligible for this scholarship, the student must be enrolled in a course meeting at least two evenings per week and must be a candidate for a bachelor's degree. In determining the recipient, grades of all courses completed in prior years are considered.

Martin Luther King, Jr. Scholarships

This scholarship fund was established in 1969 in memory of the late Reverend Martin Luther King, Jr. Awards are made, as openings occur, to a limited number of adults from minority groups who would otherwise be unable to continue their education. Stipends can cover tuition expenses not to exceed six quarter hours in any academic quarter (excluding summer quarter). Northeastern University's Office of Financial Aid, located in Richards Hall, administers these scholarships.

Angelina M. Lentini Scholarship

This scholarship was established in 1991 through the generous support of Angelina Lentini, a graduate of Lincoln College, class of 1967, and University College, class of 1969. This award is to be made to an entering freshman female student who has graduated from the Boston Public School system, and has demonstrable financial need. Recipients of this award may reapply in their upper class years for continued support. Interested students should apply to Northeastern University/Office of Financial Aid, 356 Richards Hall, Boston, MA 02115, regarding the above scholarship.

Alan A. and Shirley A. Mackey Scholarship Fund

The Alan A. and Shirley A. Mackey Scholarship Fund was established in 1987 upon the retirement of Alan A. Mackey from Northeastern University. Dean Mackey served Northeastern University in many capacities: as Dean of Administration, University Registrar, Dean of Continuing Education, and as a member of the mathematics faculty of University College. The scholarship fund provides annual scholarship awards to deserving University College students.

William J. McGovern Memorial Scholarship

The William J. McGovern Memorial Scholarship was established in 1978 by an anonymous donor to honor the memory of William J. McGovern. The donor wishes to assist others in realizing their potential through higher education. The income from this scholarship benefits worthy undergraduate students actively pursuing studies in University College or the School of Engineering Technology. Recipients must have declared a major, demonstrated financial need and academic achievement, and exhibited a high level of professional promise.

Helen (Boris) Melnik Memorial Nursing Scholarship

The Helen (Boris) Melnik Memorial Nursing Scholarship is to be awarded to a student who is a certified nursing assistant (CNA), licensed practical nurse (LPN), or registered nurse (RN) and who demonstrates financial need, academic promise, and the desire to continue a career in the nursing profession.

Helen (Boris) Melnik was one of the 3,236 graduates of the New England Deaconess Hospital's School of Nursing. Though taken ill early on in her own career, it is her family's hope that this scholarship assist another practicing nurse in advancing in this caring profession. To be eligible for this award, a student should be a currently certified nursing assistant (CNA), licensed practical nurse (LPN) or registered nurse (RN) and demonstrate financial need, academic promise and the desire to continue a career in the nursing profession.

Timothy F. Moran Scholarship Fund

This scholarship fund was established upon the retirement of Dean Timothy F. Moran, Associate Dean at University College and Director of the Law Enforcement programs. During his second career as an educator, Dean Moran, a retired state police officer, was an innovator and leader in the education of law enforcement officers both in New England and throughout the world. His former students, colleagues, and friends made substantial contributions to establish this fund in his honor. This scholarship is awarded annually to students majoring in policing, security or corrections who demonstrate academic excellence and financial need.

Eva Needle Memorial Scholarship

The Eva Needle Memorial Scholarship Fund was established in 1965 with the aid of the Norman Knight Charitable Foundation and is maintained through the generosity of the friends of Bob and Ted Needle in memory of their mother. The income from the fund is awarded annually to a deserving student in the accounting program who demonstrates superior academic achievement. The recipient is selected jointly by Ted Needle, a long-standing member of University College's accounting faculty, and the Scholarship Committee.

Harry Olins Memorial Scholarship

The Harry Olins Memorial Scholarship Fund was established as an expression of a belief in University College students and "what they stand for." The fund, presented by Mrs. Olins in recognition of her husband's long service on the business faculty, makes available an annual tuition award to students who, in terms of scholastic achievement, character, and personal need, best typify the spirit of Northeastern University. To be eligible for this award, the student must be a business administration degree candidate and carry a full academic load during the school year.

Nancy Lee Patterson Memorial Scholarship

This fund was established in 1988 by the family and friends of Mrs. Nancy Lee Patterson at the time of her death. Income from the fund is awarded annually to female students, age 35 or over, attending University College, who demonstrate financial need, soundness of character, and academic stability.

Sigma Epsilon Rho Honor Society Scholarship Award

The Sigma Epsilon Rho Honor Society Scholarship Awards, established in 1974 by the membership of the Society, are awarded annually to undergraduate students of University College and the School of Engineering Technology. Eligible students must have a cumulative quality-point average of 3.25 or better after completing 75 percent or more of their required studies.

The Stotsky Award

The Stotsky Award was created in 1990 when Dr. Bernard A. Stotsky, after 28 years of dedicated service as a faculty member and Chief Psychiatrist at the Lane Health Center, established a fund at Northeastern University in memory of his parents, George and Bess Stotsky.

A cash prize of \$250 will be presented annually to one or more students who have exhibited an unusual understanding of, and sensitivity to, Jewish history with particular reference to the Holocaust period. Works submitted for consideration may include, but are not limited to, research in the field, special projects, programs or activities designed and implemented to enhance understanding of the Holocaust.

Any student in good standing, currently enrolled in any school, department or program of Northeastern University is eligible to receive the Stotsky Award. Submissions made by March 1st will be eligible for the current year's award.

This award is administered by the Religious Life Office of Northeastern University. Interested students should contact them at (617) 373-2728 for further details. The mailing address is: Religious Life Office, Room 207 Ell Building, Northeastern University, Boston, MA 02115.

H. Patricia Taylor Scholarship Fund

The H. Patricia Taylor Scholarship Fund was established in 1974 by H. Patricia Taylor, a graduate of University College, and her husband, Harry C. Taylor, a graduate of the School of Business. The scholarship expresses their appreciation for financial assistance made available to Mrs. Taylor when she was obtaining her degree and is an attempt to provide similar funds to assist others in realizing their potential through higher education. The income from the fund is awarded annually to a student enrolled in University College or the School of Engineering Technology who demonstrates financial need and academic stability and who meets certain other conditions of eligibility.

Transportation Club of New England Scholarship

The Transportation Club of New England provides a generous annual scholarship for a person employed in transportation and industry traffic departments. Awarded in May of each year, the scholarship is applicable toward tuition, books, and incidental expenses involved in transportation management courses. The Club's purpose is to afford some student an opportunity to expand and improve their education by systematic study of transportation and distribution management. The scholarship is administered cooperatively with the Scholarship Committee of the Transportation Club of New England. Applicants must be sponsored by a member of the Transportation Club. Application information may be obtained by contacting Mr. William G. Donovan, Secretary/Treasurer, 29 Cushing Avenue, Hingham, MA 02043. Telephone number is (617) 749-4406.

U.S. Navy Field Training Supervisors Association Memorial Scholarship

A scholarship fund has been established through the generosity of the U.S. Navy Field Training Supervisors Association in commemoration of the Association's deceased members. The scholarship is awarded annually to a deserving student, selected by the Scholarship Committee, who is a management major working toward a bachelor's degree in the evening program at University College.

University College and the School of Engineering Technology Faculty Society Memorial Scholarship Awards

The Faculty Society of University College and the School of Engineering Technology offer two awards annually, primarily for excellence in studies, to bachelor's degree candidates in University College and the School of Engineering Technology who have carried and are currently carrying a minimum of twenty-four quarter hours annually. Applications, available during the winter quarter, must be returned before the spring quarter. These awards are given in commemoration of the Faculty Society's deceased members.

Roberta Macycove Wasserman Memorial Scholarship

This scholarship was established in 1976 through the generosity of family members and friends of Roberta Macycove Wasserman, who, at the time of her death in 1975, was pursuing liberal arts studies within University College. The income from the fund is awarded annually to a deserving female student who is a homemaker with family responsibilities and who is pursuing part-time studies within University College. The recipient shall demonstrate financial need, soundness of character, and academic stability.

Awards

John W. Robbins Prize

The John W. Robbins Prize was established in 1984 under the terms of the will of the late Lena C. Robbins, in memory of her husband, John W. Robbins, an alumnus of Northeastern University. The income from this memorial gift is awarded annually to the outstanding student (Class Marshal) of the graduating class of University College.

Facilities and Resources

Sport, Dance, and Exercise Facilities

Through its Cabot Center for Physical Education, Dockser Hall and Barletta Natatorium, Northeastern University offers a wide variety of specialized facilities, including basketball courts, dance studio, indoor athletic field and running track, indoor tennis courts, gymnastics room, combatives room, weight-training rooms (including Nautilus equipment), swimming pool, crew practice tank, racquetball courts, and motor performance and exercise physiology laboratories. The Matthews Arena, with seating for more than 5,000 fans, provides home ice to the University's hockey teams and home court for the University's men's basketball teams.

Social and Professional Clubs

We welcome and encourage part-time students in University College and the School of Engineering Technology to join in the social and professional activities that are organized and run by the student body, with the assistance of the Office of Academic and Student Affairs. If you and your peers are interested in starting new professional clubs, the office will help to plan and organize locally and nationally. Call 617-373-2400 or TTY 617-373-2825 for more information.

Sigma Epsilon Rho Honor Society

Sigma Epsilon Rho is the University College honor society. It aims to promote fellowship among those students who have attained highest scholastic standing in the College; to stimulate the student body to higher scholastic accomplishment through the bearing, influence, and work of these selected men and women; to develop methods of mutual improvement and advancement among members; and to support high moral, professional, and scholastic ideals. Only honor graduates are eligible for admission to the Society. Admission is by invitation after nomination by the Society.

Ell Student Center

The Carl S. Ell Student Center provides facilities for student recreation and extracurricular activities. The Eugene J. Blackman Auditorium, with a seating capacity of 1300, is attached to the Center. Also included are special drama facilities, a ballroom, main lounge, student offices, conference rooms, and cafeteria with seating for more than 1000. The bookstore is adjacent to the Center.

Lane Health Center

A comprehensive program of medical care is provided to all full-time graduate and undergraduate students. The University maintains a Health Services Clinic which is open for emergencies at all times and is equipped to deal promptly with any medical condition that may arise. All entering full-time students must submit a pre-entrance physical examination form provided by the Lane Health Center prior to registration. Failure to fulfill this requirement will delay registration and result in a penalty fee and an additional fee for a physical examination.

Alumni Association

Upon graduation, you will join the more than 120,000 alumni united within the Alumni Association, which was established to promote a mutually rewarding relationship between Northeastern and its graduates. Association activities include the Homecoming celebration, presentation of the Outstanding Alumni Awards, and the annual presentation of Professional Promise Awards to outstanding seniors. The Association has regional clubs across the country.

About Northeastern University

Profile of the University

At Northeastern University, we value part-time day and evening students as highly as we do our full-time students. You are important members of the academic community and reflect the changing profile of today's college student, which encompasses new concerns for lifespan learning and professional retraining. Northeastern supports your pursuit of personal and professional goals and wants to contribute to your success. You may join all of our students in taking full advantage of the academic resources and facilities we offer. In return, you contribute to the intellectual and cultural diversity upon which this urban institution thrives.

Founded in 1898, Northeastern University is incorporated as a privately endowed, nonsectarian institution. From its beginning, the University's mission has been to identify and address the educational needs of a diverse community and student body in distinctive and useful ways. Northeastern did not duplicate the programs of other institutions, but instead became a world leader in new areas of educational service. In particular, the University is known for its Cooperative Plan of Education, under which students alternate periods of work and study. All of Northeastern's undergraduate day colleges operate on the Cooperative Plan, and several of the University's graduate schools have structured their programs to include features of cooperative education. Today, the University is comprised of eight undergraduate colleges and nine graduate schools.

Our undergraduate colleges are:

- Bouvé College of Pharmacy and Health Sciences
- College of Arts and Sciences, including the School of Journalism
- College of Business Administration
- College of Computer Science
- College of Criminal Justice
- College of Engineering, including the School of Engineering Technology
- College of Nursing
- University College

Our graduate schools are:

- Graduate School of Arts and Sciences
- Graduate School of the Bouvé College of Pharmacy and Health Sciences
- Graduate School of Business Administration
- Graduate School of Computer Science
- Graduate School of Criminal Justice
- Graduate School of Engineering
- Graduate School of Nursing
- Graduate School of Professional Accounting
- School of Law

At Northeastern University, we respond to the needs of people who already hold jobs or are launched in careers, but who wish to advance or change their professional lives as well as pursue personal interests. The University offers a variety of educational options—both credit and noncredit—to suit your particular objectives. University College offers part-time courses leading to certificates and to associate's and bachelor's degrees. The School of Engineering Technology offers part-time evening and weekend associate's and bachelor's degree programs in technological areas, in addition to daytime undergraduate programs.

All formal courses of study leading to degrees through part-time programs are approved by the full-time day faculty of the Northeastern Basic Colleges concerned and are governed by the same qualitative and quantitative standards.

Where You'll Find Northeastern

The main campus of Northeastern University is a vibrant and progressive urban community. To all Northeastern students, the physical setting of the Boston campus extends opportunities to participate in the dynamic, exciting environment that we share with city residents. Built around a quadrangle, the campus is divided by Huntington Avenue, a major artery. It is located in the midst of such cultural landmarks as Symphony Hall, the Museum of Fine Arts, the Isabella Stewart Gardner Museum, Horticultural Hall, and the Boston Public Library. You can walk to Fenway Park, Copley Place, the Back Bay shopping district, and a number of internationally renowned hospitals and research and teaching centers. In 1910, the University began construction on the first piece of land acquired at its present site; it now covers more than fifty-five acres.

To reach increasing numbers of students and to make participation in our programs as convenient as possible for you, Northeastern University has established suburban campuses and branch locations, as well as several off-campus athletic facilities. The campuses and branch locations house administrative and classroom facilities for Northeastern's graduate, part-time day and evening, and continuing education programs. The University also maintains many affiliations to ensure access to facilities and specialized equipment available at other institutions and organizations.

The Dedham campus, just north of Route 128, houses the Center for Continuing Education and provides space for the College of Business Administration's High Technology MBA and Executive MBA programs and the Center for Management Development's Management Workshops.

Near the junction of Routes 128 and 3 in Burlington is the Suburban Campus of Northeastern University. Part-time undergraduate courses in a variety of subject areas and part-time graduate courses in engineering and business administration are offered here. The Burlington campus also offers special programs for part-time, evening, and noncredit continuing education courses.

Located near the Burlington campus, the Botanical Research Station in Woburn contains a small arboretum and a spacious greenhouse for propagation and research.

Situated on fifty acres in Ashland, the Warren Center provides a practical laboratory for outdoor education and conservation, and camping administration, programming, and counseling. In the summer, the center becomes an attractive campsite for various community and University groups and is available for conferences and workshops.

Twenty miles northeast of Boston, the Marine Science and Maritime Studies Center is located in Nahant, on Massachusetts Bay. It serves as a site for national, international, and University research.

Henderson House, Northeastern University's conference center, is located twelve miles from Boston in suburban Weston. This facility hosts a variety of activities, including residential seminars, workshops, short courses, and weekend meetings.

University Libraries

Together, the collections, services, staff, and facilities of the Northeastern University Libraries provide access to information and an understanding of the organization of the literature and other information resources of the academic disciplines. The library is integral to the academic and research processes, whether these occur in a formal classroom, seminar, or laboratory setting or through individual study and enrichment.

All part-time students have full access to all units of the University Libraries located on the Boston and Burlington campuses and at the Marine Science Center in Nahant.

Snell Library, a centralized library built in 1990 for the Boston campus, has 2,800 seats on five levels and shelving for more than 1.25 million volumes. Library services incorporate online, telecommunication, and media technologies that are associated

with information resources, including an online catalog and circulation system, micro-computer and language laboratories, specialized equipment for users with disabilities, a media center, and a CD-ROM optical disc network.

Total holdings of the University Libraries include more than 725,000 volumes, 1,700,000 microforms, current subscriptions to over 8,000 serials and newspapers, 150,000 government documents, and 14,000 audio, video, and computer software titles.

Library staff are available in all service areas to assist students, including students with disabilities. Librarians provide instruction to groups and to individuals on the bibliographic research process and on strategies for identifying, locating, and using information resources. Each term, a series of tutorials is offered giving students further opportunities to meet with a librarian to discuss particular or specialized research needs.

Northeastern University is a member of the Boston Library Consortium, a cooperative arrangement among the following academic and research institutions: Boston College, Boston Public Library, Boston University, Brandeis University, Marine Biological Laboratory/Woods Hole Oceanographic Institution, Massachusetts Institute of Technology, Northeastern University, the State Library of Massachusetts, Tufts University, the University of Massachusetts (Amherst and Boston campuses), and Wellesley College. The University's membership in the Boston Library Consortium generally allows for on-site use by, but does not grant borrowing privileges to, students at Northeastern. Some of the consortium libraries and many of the other libraries in the Boston area require that a visiting student present a special pass or letter of introduction. A Northeastern reference librarian can advise about such student visitor policies.

Division of Academic Computing

The Division of Academic Computing (DAC) facilitates the use of computers by Northeastern students and members of the faculty. Some years ago that meant maintaining one good-sized computer, used primarily by those doing advanced work in engineering, mathematics, or the physical or biological sciences. More recently, computing has found productive use in nearly every field of study pursued at the University. At the same time, computing activities have increasingly migrated to personal computers, altering the nature of the need for computing services. DAC is committed to meeting these new challenges while continuing to support the traditional, computationally intensive uses of computing.

DAC's Personal Computing Initiative supports personal computing with negotiated discounts on hardware and software, available through the Northeastern Computer Store. Through advice, training, and assistance on personal computer use, the intent of the initiative is to provide an environment as hospitable and supportive as possible to the personal mode of computing, including the ability to connect personal computers to university computing systems. DAC maintains the lynx communication system for the exchange of computer mail and conference discussions. Computer mail can also be exchanged with users at any of the several thousand computers at other institutions. Participation in lynx is available to any member of the Northeastern community and is free. To sign up for a lynx account, bring a valid Northeastern I.D. to 39 Richards Hall during business hours.

Division of Academic Computing also maintains mainframe computing resources, most notably the VAXCluster Systems, and the numerous public-access labs of personal computers and terminals on the Boston, Dedham, Burlington, and Liberty Square campuses. An advanced high-speed network connects the university's computing facilities and links them to other computers at locations around the world. ACCESS, the newsletter of the division, appears seven times a year and includes the locations and facilities of the labs and news about other DAC and CRC services and facilities.

Research

Research and scholarship are integral parts of Northeastern University's commitment to the intellectual growth and academic achievement of its students. Research activities span almost every academic field and include laboratory projects, theoretical studies, and technological applications.

Funding for research comes from government agencies, foundations, corporations, and the University itself. In recent years such industrial firms as Beckman, General Electric, Digital, and Lockheed have supported Northeastern's research programs. Currently, external grants and contracts exceed \$27.5 million annually.

Northeastern's faculty numbers among its ranks some of the most distinguished scholars in their fields, and many have received such prestigious awards as Sloan Scholarships, Guggenheim Fellowships, National Institutes of Health Research Awards, Fulbright Scholarships, and a MacArthur Foundation grant. Faculty members lecture the world over, serve as consultants to industry and government agencies, participate on a variety of national and international committees, and are quoted frequently in the regional and national press on a wide range of subjects.

Programs at Northeastern

Undergraduate Colleges

Bouvé College of Pharmacy and Health Sciences

Offers five-year, cooperative education program leading to the Bachelor of Science in Pharmacy, Respiratory Therapy, Toxicology, Physical Therapy, and to the Bachelor of Science with majors in medical laboratory science, cardiovascular health and fitness, and athletic training. A non-cooperative four-year baccalaureate program is offered in dental hygiene. Associate's degree programs are offered in medical laboratory science and dental hygiene. The College also offers post-baccalaureate certificate programs for physician assistants (the PA option is a 2-year full- or part-time program with the option of a Master of Health Professions), respiratory therapy, cardiovascular technology, perfusion technology, and medical laboratory science (concentrations in blood banking, clinical chemistry, hematology, immunology, and microbiology). For information, call 617-373-3320.

College of Arts and Sciences

Offers programs in the visual and performing arts, humanities, journalism, social sciences, physical and natural sciences, and mathematics leading to the Bachelor of Arts and Bachelor of Science degrees. Programs are normally four years in length on a full-time plan or five years in length on the cooperative plan. For more information, call 617-373-3980.

College of Business Administration

Offers four- and five-year, cooperative education programs leading to the Bachelor of Science in Business Administration. Students complete a concentration in accounting, human resources management, marketing, finance and insurance, management, international business administration, entrepreneurship and small business management, management information systems or logistics and transportation. Also available is a program leading to a Bachelor of Science in International Business. For more information, call 617-373-2200.

College of Computer Science

Offers a five-year and a four-year cooperative education program leading to the Bachelor of Arts in Computer Science, and the Bachelor of Science in Computer Science, with emphasis tracks in database management, languages, and operating systems. Other electives include parallel processing, graphics, distributed computing, and artificial intelligence. Research opportunities are available to advanced students. For more information, call 617-373-2462.

College of Criminal Justice

Offers a five-year, cooperative education program leading to the Bachelor of Science degree. For more information, call 617-373-3327.

College of Engineering

Offers four- and five-year cooperative education programs in chemical, civil, electrical (including a power systems option and a computer engineering option), industrial, and mechanical engineering leading to the Bachelor of Science with specification according to the department. A more general program leading to the Bachelor of

Science without specification is also offered. For highly qualified students, the electrical and computer engineering, mechanical engineering, and industrial engineering and information systems departments offer five-year programs leading to the bachelor's and the master's degrees; students generally carry five courses per quarter and forego one cooperative work quarter to complete the program. The College also offers a six-year, part-time evening program leading to the Bachelor of Science degree in civil, electrical, or mechanical engineering. For more information, call 617-373-2154.

College of Nursing

Offers five-year, cooperative education program leading to the Bachelor of Science in Nursing. The College welcomes transfer students who have a degree in another field or who have completed a minimum of 45 quarter hours of credit including *Chemistry 1* and 2 and *Anatomy and Physiology 1* and 2 to enter the 2 year, 9 month accelerated track. The College also offers an R.N. to B.S.N. option to registered nurses who wish to pursue a baccalaureate degree in nursing. The R.N. to B.S.N. option is offered for full-time day students by the College of Nursing and for students desiring part-time evening study in collaboration with Northeastern University's part-time unit, University College. For more information call 617-373-3610.

School of Engineering Technology

The School of Engineering Technology, a division of the College of Engineering, offers programs leading to the Associate in Engineering, Associate in Science, and Bachelor of Engineering Technology degrees. A full-time, five-year cooperative education plan is offered, at the baccalaureate level, in electrical and mechanical engineering technology and computer technology. In addition to the majors mentioned for full-time study, part-time evening and weekend programs are available at the associate and baccalaureate levels in telecommunications, environmental, manufacturing, structural, and surveying and highway engineering technology. A C/C++/UNIX Specialist Certificate program is available on a part-time basis as well. A baccalaureate degree program in aerospace maintenance engineering technology is available for transfer students, both full- and part-time. Many of the technology courses are televised via Network Northeastern to satellite campuses and company sites. For more information, call 617-373-2500.

Graduate Schools

Bouvé College of Pharmacy and Health Sciences

Offers programs leading to the Master of Science degree in general biomedical science, hospital pharmacy, medical laboratory science, medicinal chemistry, pharmacology, toxicology, clinical exercise physiology, counseling psychology, rehabilitation counseling, and speech-language pathology and audiology, human resource counseling, applied behavior analysis, college student development and counseling, applied educational psychology with specialties in school counseling and school psychology, a Master of Science in Education (intensive special needs), and a Master of Science in Education (special needs). The Master of Health Professions is offered with four options: general, health policy, physician assistant, and regulatory toxicology. The Certificate of Advanced Graduate Study may be earned in counseling psychology, rehabilitation counseling, school psychology, or human services specialist. A *Doctor of Philosophy degree* is offered in biomedical science with specializations in medical laboratory science, medicinal chemistry, pharmaceuticals, pharmacology, or toxicology. A graduate program in clinical pharmacy, leading to the Doctor of Pharmacy, is also available. The Doctor of Education degree is offered in counseling psychology and school psychology. For more information, call 617-373-3380.

College of Arts and Sciences

Offers programs leading to the Master of Arts degree in economics, English, history, journalism, political science, sociology, social anthropology, and writing. The Master of Science degree is available in biology; chemistry; economic policy and planning; law, policy, and society; mathematics; and physics. The Master of Technical and Professional Writing, the Master of Public Administration, and the Master of Education degrees are also offered. In addition, there are programs leading to the Certificate of Advanced Graduate Study in advanced literary study and to the Doctor of Philosophy degree in biology; chemistry; economics; English; law, policy, and society; mathematics; physics; psychology; and sociology. There are also non-degree certificate programs in elementary and secondary teacher certification, in writing and in technical writing. Most programs may be completed through either full- or part-time study. For more information, call 617-373-3982 to be referred to the department of interest.

College of Business Administration

Offers five programs leading to the Master of Business Administration (MBA) degree. Options include a Cooperative Education MBA program, a full-time MBA program, and a part-time MBA program. An Executive MBA program tailored to the needs of experienced managers and a High-Technology MBA program designed for professionals in the high technology community are also offered on a part-time basis. Additionally, a nondegree program leading to the Certificate of Advanced Study is available. For more information, call 617-373-2714.

The Graduate School of Professional Accounting offers a unique fifteen month comprehensive MS/MBA degree program specifically designed for the liberal arts and sciences graduate. The program features a three-month paid internship with a major CPA firm and achieves virtually 100% placement for its students upon graduation. For more information, call 617-373-3244.

The GSPA also offers a Master of Science in Taxation Program (MST) on a part-time basis for those already qualified in the accounting or business fields seeking to become tax or personal financial planning specialists. It is a small, selective program regarded as the qualitative leader in tax education.

The Center for Management Development offers a variety of graduate-level nondegree programs and custom corporate in-house management education programs. For more information, call 617-373-3273.

College of Computer Science

Offers full-time and part-time programs leading to the Master of Science in Computer Science with concentrations in artificial intelligence, communications and networks, databases, operating systems, programming languages, graphics and image processing, and theory. The Doctor of Philosophy program includes theory, artificial intelligence, data-base management, parallel distributed computing, programming languages, and systems. For more information, call 617-373-2462.

College of Criminal Justice

Offers both full-time and part-time study leading to the Master of Science in Criminal Justice. A full-time program normally takes one full year for completion. While students are encouraged to tailor their program to meet their own educational and career objectives, the curriculum offers specialization in Justice Administration, Criminology, Juvenile Justice, Security Administration, and Research. For more information, call (617) 373-3327.

College of Engineering

Offers full-time and part-time programs leading to the Master of Science in chemical engineering, civil engineering, computer systems engineering, electrical engineering, engineering management, industrial engineering, information systems, and mechanical engineering. The engineer degree is available in the departments of electrical and computer engineering, industrial engineering and information systems, and mechanical engineering. A five-year program leading to both a Bachelor and a Master of Science degree is offered in electrical, industrial, and mechanical engineering. The Doctor of Philosophy degree is offered in chemical engineering, civil engineering, electrical engineering, industrial engineering and mechanical engineering. An interdisciplinary Doctor of Philosophy is available for graduate students whose interests overlap two or more departments. Women in Engineering and Women in Information Systems programs are also available. For more information call 617-373-2711.

College of Nursing

Offers a full-time and part-time Master of Science in Nursing program. The master of science degree may be earned with a specialization in Nursing Administration, Community Health Nursing, Critical Care Nursing, Nurse Anesthesia, Primary Care Nursing (Nurse Practitioner) or Psychiatric-Mental Health Nursing. For more information, call 617-373-3125.

School of Law

Offers a full-time day program leading to the juris doctor degree. The three-year curriculum includes four quarters of work experience in judges' chambers, law firms, governmental agencies, and other legal settings. Concurrent degree programs for the M.B.A., M.S. in accounting and Ph.D. in Law, Policy and Society are available. For more information, call 617-373-2395.

Division of Continuing Education

Northeastern University established continuing education programs over thirty years ago to provide a practical, high quality career-related education in business and industry consistent with the University's tradition of adult education. The mission of the division is to be a leader in nondegreed continuing education for the career professional. Courses are taught primarily by practitioners in their respective fields. Program development, courses, and seminars are based on market needs and wants and are offered at convenient off-campus locations and at company sites. The division continues to enhance Northeastern University's regional and national reputation as a leader in continuing education via such technological advances as microwave and satellite transmission. For further information on the programs, telephone the division office at 617-373-5828.

Northeastern University Center for Family Business

Northeastern University's Center for Family Business is a membership based program offering full day seminars and highly interactive workshops to family owned businesses. Programs focus on a variety of topics from leadership succession and ownership transfer to conflict resolution around issues of power, control, and money. The Leadership Development Forum for younger generation members complements the core program. Continuing education is also offered to non-members on a select basis and to professionals serving family businesses. For further information, telephone 617-320-8000, ext. 8015.

State-of-the-Art Program

The State-of-the-Art Program offers evening, day, and Saturday courses, seminars, and on-site training designed for working professionals seeking practical, hands-on education in a work-related area of technology. The curriculum includes courses and certificate programs in high-level computer languages, data communications, biotechnology, computerized automation technology, telecommunications, microelectronics/semiconductor science, microwave engineering technology, artificial intelligence, assurance technology, software engineering, and technology management. For further information, telephone the State-of-the-Art Program at 617-320-8000, ext 8052.

Building Design and Management Program

Designed for a broad spectrum of professionals either presently in or considering some aspect of the building and construction technologies. Evening courses, on-site training, and seminars include architecture, facilities management, real estate inspections, landscape management, construction law, real estate appraisal, license examination preparation, and specialty courses for professional engineers. Certificate programs are offered in building and construction technology, facilities management, construction superintendent, HVAC systems design, advanced HVAC systems management, land surveying, fire protection systems, real estate inspections, and construction management. For further information, telephone 618-320-8000, ext. 8026.

Environmental and Regulatory Management

This program covers the essentials of regulation, evaluation, assessment, and management techniques in today's environmental industry. Evening courses, custom on-site corporate training, and seminars are offered which explore how to create, implement, and document compliance; risk assessment; solid and hazardous waste management; occupational health and safety procedures; site evaluation; subsurface exploration; and remediation. Certificates of Professional Achievement are offered in environmental hazardous waste management and solid waste management. For further information, telephone 617-320-8000, ext. 8026.

Paralegal Professional Program

The Paralegal Certificate Program offers an intensive 12-week training course designed to give participants hands-on practical paralegal training. The Specialist Courses and Workshops offer training on specific legal topics such as legal research/writing, real estate, family law, litigation, and labor law. Pre-law School Studies offers an LSAT review course, a study techniques course, and a law school preview course. For further information, telephone 617-320-8000, ext. 8047.

Test Preparation Program

The Test Preparation Program offers courses to help prepare for the LSAT, GMAT, and GRE examinations, providing the participant with an in-depth exposure to the subject matter. For further information, telephone 617-320-8000, ext. 8047.

Insurance and Financial Services Institute

Established to foster excellence in the insurance and financial services communities in the Boston area, the institute offers courses and seminars in general insurance, risk management, insurance licensing, and financial planning. These study programs assist those seeking to develop or to update professional credentials. For further information, telephone 508-533-5101.

Network Northeastern

Network Northeastern utilizes the microwave-based Instructional Television Fixed Service (ITFS) system to broadcast courses to over 30 local companies and to the Burlington and Dedham campuses. Live classroom instruction is telecast to remote sites where students interact with their instructor via a telephone-based talkback system. A courier service is provided to collect and deliver course materials and to serve as the off-campus student's link to academic and administrative departments at the Boston campus.

Network Northeastern currently broadcasts educational programs to over 30 local corporations. Courses are offered in graduate engineering, graduate computer science, undergraduate engineering technology, and state-of-the-art programs for professional development. Network Northeastern also delivers graduate level and short courses to corporations throughout the United States via satellite.

Faculty

*Denotes senior lecturer as of October 1992.

Barbara Abeles, M.B.A.
Management
Abeles Associates

Kimiko Abramoff, M.A.
Modern Language

Hon. Herbert Abrams, M.L.*
Criminal Justice and Security
Superior Court of Massachusetts

Michael J. Abruzzese, M.B.A.*
Information Systems
Primerica Financial Services

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Silver and Ahern

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Katharine Gibbs

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Janis L. Anderson, Ph.D.
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Brigham & Women's Hospital

Rae Andre, Ph.D.
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Boston Edison

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Joseph T. Arcidiacono, B.S.*
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Varian Associates

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Digital Equipment Corp.

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Bolt Beranek and Newman, Inc.

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University Hospital

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JNB Assoc., Inc.

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Home Care Group, North Shore

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Board of Real Estate Brokers

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P.C. Week

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Connolly Intl. Ltd.

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Lesley College

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University of Massachusetts Medical Center

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MacDonald, Wallace and Rowley, PA

Patricia Bench, M.Ed.
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Customized Trans., Inc.
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Charles J. Carr, M.B.A.*
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Clark's Corner, Inc.
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Peabody School System
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Joan Curtice, M.A.
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Bairj Donabedian, Ph.D.
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ELD Associates
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Information Systems
Self-employed
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Accounting
Morgan Memorial Goodwill Indus.
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Federal Home Loan Bank of Boston
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Haggis Consulting
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Lawrence-Eagle Tribune
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New England Marine Educational Services
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Salem State College
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Watertown School Department
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Curry College
- George J. Koslosky, M.B.A.**
Purchasing
Mercury Computer Systems
- Mitchell G. Kostoulakos, M.B.A.**
Transportation
Yellow Freight Systems
- Bennett L. Kramer, M.S.***
Information Systems
Massasoit Community College
- Bonnie K. Kramer, M.A.**
American Sign Language
R.E.A.D.S., Inc.
- Ellen M. Kramer, M.A.***
Health Science
- Rheta I. Kramer, M.A.***
Mathematics
- Elliott A. Krause, Ph.D.**
Sociology/Anthropology
Northeastern University
- Art Krauss, M.F.A.**
Art
Becker College
- Carolyn L. Kraut, M.S.**
Information Systems
Self-employed
- David H. Kravetz, J.D.***
Business Law
Law Offices of David H. Kravetz
- Steven A. Kravetz, M.B.A.***
Accounting
Apparel Retail Corp.
- Eric J. Krieg, M.A.**
Sociology/Anthropology
- Laura J. Krims, J.D.**
Business Law
Fitzhugh Associates
- Michael P. Krone, Esq., J.D.***
Business Law
Private Law Practice
- Daniel D. Kurylo, Ph.D.**
Psychology
Massachusetts Institute of Technology
- Paul LaPlante, M.A.**
Modern Language
Northeastern University
- Janine E. Labak, M.S.W.**
Technical Communications
Self-employed
- Joan F. Labbadia, E.D.**
Human Resources Management
Northeastern University
- Walter E. Labonte, M.A.**
English
- Bruce G. LaFlamme, M.S.W.***
Health Management
Massachusetts Department of Mental Retardation
- Valerie A. Lamb, B.S.**
Radiologic Technology
Northeastern University
- David E. Lambert, Ph.D.**
Criminology Research
Massachusetts State Police
- Stephen R. Lancey, Ph.D.***
Psychology
Boston VA Medical Center
- Mark J. Landry, M.Ed.**
Art
Weymouth High VocTech
- Robert H. Landry, M.B.A.***
Accounting
Massasoit Community College
- Timothy F. Landy, B.S.**
Information Systems
Commonwealth of Massachusetts
- Susan D. Lane, M.B.A.**
Marketing
Marketing Advantage
- Norma Jane Langford, M.S.**
Speech Communication
Northeastern University
- Ronald A. Lanoue, M.A.**
Economics
- Pamela J. Laskey, M.A.**
Speech Communication
D.C. Heath
- Matthew Laudato, M.S.**
Computer Literacy
Northeastern University
- Thomas A. Lawler, M.S.**
Accounting
Kesner-Marcus & Co. CPAs
- Charles E. Lawton, M.Ed.***
English
Rhode Island College
- Alfred Lazzeri, M.F.A.***
Art
Freelance Artist
- Paul A. Leblanc, M.B.A.**
Finance
Digital Equipment Corp.
- Stewart L. Lebo, M.S.***
Information Systems
Bank of Boston
- Cynthia Lee, Ph.D.**
Human Resources Management
Northeastern University
- Hollington Lee, B.S.***
Biology
Lee Graphics
- Jennifer Leeman, M.A.**
Modern Language
Constance Leigh, M.A.*
- Bernard J. Lemire, B.S.**
Chemistry
Northeastern University
- Philip W. Le Quesne, Sc.D.**
Chemistry
Northeastern University
- Thomas R. Lerra, Ph.D.**
Management
Quinsigamond Community College
- M. X. Lesser, Ph.D.**
English
- Adolfo S. Leung, M.S.**
Information Systems
Adept, Inc.
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Management Sciences
Charles Stark Draper Labs
- Lawrence J. Levine, Ed.D.**
Therapeutic Recreation
City of Boston
- Joseph L. Levy, M.B.A.**
Marketing
J.L. Levy & Associates
- Philip A. Levy, B.A.**
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Digital Equipment Corp.
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Child World, Inc.
- Don E. Lewis, M.F.A.***
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Northeastern University
- Joel W. Lidz, Ph.D.**
Philosophy/Religion
- Janet K. Linder, J.D.**
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Self-employed
- Joanne G. Linowes, M.S.***
Speech Communication
The Corporate Media Group
- Robert L. Litrownik, Ph.D.***
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Taunton State Hospital
- Xiaolan Liu, M.A.**
Sociology/Anthropology
- Bryan S. Lloyd, M.Ed.**
American Sign Language
- Joseph S. Lo Castro, Ph.D.***
Psychology
Boston VA Medical Center
- Linda V. Lockwood, M.S.W.**
Sociology/Anthropology
- Richard B. Lockwood III, C.A.G.S.**
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Bigelow Associates
- Sebastian C. Lockwood, M.A.**
English
- Richard C. Logan, M.B.A.***
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Medical Records Associates
- Daniel M. Lomba, Jr., B.S.**
Economics
- Edward J. Lonczak, M.B.A.***
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Western New England College
- Stefanos Loukanaris, M.A.**
Economics
- Miller C. Lovett, Ph.D.***
Human Resources Management
University of Massachusetts/Boston
- Sharron J. Loving, M.B.A.**
Marketing
Independent Consultant
- Bradley J. Lovoi, M.A.**
Political Science
- James H. Lowell, M.A.**
Philosophy/Religion
- Marilyn K. Lowitt, M.A.**
Human Resources Management
The Community Builders
- Hope E. Luder, M.A.***
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- Christopher F. Ludwig, B.F.A.**
Art
Robbins
- Carol Luttrell, Ph.D.**
Management Sciences
- Maureen C. Lynch, M.A.***
English
Self-employed
- Sarah-Ann Lynch, M.A.**
Political Science
EF Foundation
- Daniel W. Lyons, J.D.***
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Silver and Ahern
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Putnam Company
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Re/Max Lions Realty
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Cambridge School Department
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RAM Contracting
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New England Medical Center Hospital
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- Thomas J. MacDonough, M.A.***
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Town of Norwood
- Kim MacInnis, M.A.**
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Northeastern University
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- James E. MacNeil, Jr., M.S.**
Earth Science
Concord Public Schools
- Sylvia A. MacPhee, M.S.***
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Lasell College
- Maxine MacPherson, B.A.**
Information Systems
Social Security Administration
- Michael J. Maggard, Ph.D.**
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Northeastern University
- Judie P. Magidson, Ed.D.***
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Northeastern University
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Northeastern University
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Mass Ed. Computer Network
- Thomas Maguire, M.B.A.**
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Boston Business School
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Information Systems
Town of Braintree
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Norfolk Superior Court
- Valentina Maiewskij-Hay, Ph.D.**
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Susan S. Maire, J.D.
- Susan S. Maire, J.D.**
Business Law
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 Star Market Company

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 Science Application Int. Corp.

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 Mitre Corp.

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 Youville Hospital

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English
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 Self-employed

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 Self-employed

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Music

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Health Management
 Laboure College

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Information Systems
 McNamara & Associates Inc.

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History
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Christopher E. Mellen, B.A.
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 CMA

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Earth Science
 Brooks School

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Industrial Management
 Wang Information Services Corp.

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Human Resources Management
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Michael A. Memmolo, M.B.A.
Human Resources Management
 Merrimack Valley Placement

Lloyd B. Merrill, B.S.*
Information Systems
 Grossman's, Inc.

Charles A. M. Meszoely, Ph.D.*
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 Northeastern University

Ingrid M. Meszoely, B.A.
Health Science
 Massachusetts General Hospital

Leonard F. Meuse, Jr., M.B.A.
Technical Communications
 Self-employed

Max Meyer, Ph.D.
Management
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Michael C. Meyer, Ph.D.
Philosophy/Religion
 Jordan B. Michael, M.B.A.

Gerry N. Michaleas, Ph.D.
Psychology
 Hellenic College

Bonnie Michelman, M.B.A.
Security
First Security Service Corp.
Bernard Michels, Ph.D.*
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Sylvia I. Mignon, Ph.D.
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Mass. Comm. Criminal Justice
Philip R. Miles, M.B.A.*
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Polaroid Corp.
Robert M. Millen, Ph.D.
Management Sciences
Northeastern University
Adriene R. Miller, M.A.
Sociology/Anthropology
Charles J. Miller, M.S.
Information Systems
Informed Solutions
Hal Miller, Ph.D.
Philosophy/Religion
Amie K. Miller-Smith, B.A.
Technical Communications
Digital Equipment Corp.
Eileen T. Mills, M.A.
English
Kellie L. Mills, A.S.
American Sign Language
Patrick N. Mingolelli, M.B.A.*
Accounting
Digital Equipment Corp.
Robert J. Minichiello, D.B.A.
Marketing
Northeastern University
Richard R. Miranda, M.B.A.*
Purchasing
Multibank Financial Corporation
Michael D. Miskinis, M.A.
Criminal Justice
Bridgewater State College
Gail F. Mohanty, Ph.D.
History
Slater Mill Historic Site
James F. Molloy, Jr. Ph.D.*
Transportation
Northeastern University
Stephen P. Molloy, M.S.*
Health Information Administration
Lowell General Hospital
Abdul Momen, Ph.D.
Management Sciences
Salem School of Business
Lawrence F. Monaghan, B.S.*
Information Systems
Bank of Boston
John E. Monahan, Jr., Ph.D.
Biology
CIBA Corning Diagnostics
Marion L. Montague, M.A.
History
Diane L. Moore, Ph.D.
Philosophy/Religion
John L. Moore, M.F.A.*
Art
Boston Center for the Arts
Kathleen M. Moore, J.D.
Real Estate
Department of the Attorney
General
Patricia A. Moore, M.A.*
Health Science
Whitmore Institute

Patricia B. Moran, M.Ed.*
Mathematics
Leslie B. Morash, M.B.A.*
Transportation
Glenn S. Mores, M.B.A.
Information Systems
Gordon College
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Information Systems
MBTA
Richard M. Morrison, M.B.A.*
Management
Mantis, Inc.
William E. Morrison, M.S.*
Human Resources Management
Management Development
Group of Boston
Peter J. Morrissey, B.S.
Information Systems
Independent Consultant
Sue L. Motulsky, M.A.
American Sign Language
Lesley College
Magdi Mousa, B.S.
Chemistry
Northeastern University
Adel Moussa, Ph.D.
Chemistry
Northeastern University
Tyrone C. Mowatt, M.B.A.
Marketing
Applied Expert Systems Inc.
Carl F. Moxey, Ph.D.*
Alternative Freshman/Biology
Northeastern University
Barbara Mulcahy, M.A.
Alternative Freshman/English
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Regis College
Robert W. Mullaly, Ph.D.
Psychology
Edmund J. Mullen, M.Ed.*
History
Northeastern University
William S. Mullen, M.A.*
Political Science
Foxboro School System
Kevin P. Mulvey, M.A.
Sociology/Anthropology
Charles W. Murphy, M.B.A.*
Finance
Bunker Hill Community College
Daniel C. Murphy, M.S.*
Journalism
New England Newspaper Assoc.
David M. Murphy, Ph.D.
Speech Communication
Massasoit Community College
Paul J. Murphy, J.D.*
Management
General Electric Company
Richard T. Murphy, M.Ed.*
Mathematics
Boston Public Schools
Thomas J. Murphy, M.B.A.
Marketing
Digital Equipment Corp.
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Technical Communications
Digital Equipment Corp.
Claire A. Murray, M.Ed.
Human Resources Management

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Real Estate
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Digital Equipment Corp.
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Digital Equipment Corp.
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Technical Communications
TechWrite Associates
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Information Systems
GTE Government Systems
Roland L. Nadeau, M.Mus.*
Music
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Julie M. Nardone, M.A.
Sociology/Anthropology
Massachusetts Department of
Corrections
Laurie Nardone, M.A.
Alternative Freshman/English
Northeastern University
Shashi Nath, Ph.D.*
Sociology/Anthropology
Mohammad A. Nawawi, Ph.D.
Political Science
Clark University
Barbara E. Neale, M.Ed.*
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Independent Concept Consultants
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David C. Nelson, B.S.*
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Lifetime Corp.
Floyd G. Newton, M.A.
Art
Players' Ring, Inc.
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Watertown Public Schools
Phuoc V. Nguyen, M.S.
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Northeastern University
Janet M. Nichols, M.B.A.*
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Small Business Consultant
Maris Nichols, M.A.
English
Bruce E. Nickerson, Ph.D.*
English/Sociology/Anthropology
Christ Episcopal Church
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Art
James A. Nocito, M.Ed.
Modern Language
Westwood High School
James C. Nolan, M.S.W.*
Human Resources Management
MBTA
Maurice J. Nolan, J.D.*
Human Resources Management
Raytheon

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Law Offices of R. Plunke
Seyed H. Noorian, M.B.A.
Finance
Boston University
Maureen A. Norton Hawk,
M.S.W.
Sociology/Anthropology
Northeastern University
Richard W. Norton, B.A.*
Information Systems
Norton Business Systems
Vincent G. Norton, M.B.A.*
Human Resources Management
Raytheon Company
Donald J. C. Novak, Ph.D.*
Philosophy/Religion
Massachusetts General Hospital
Edward G. Novello, M.B.A.*
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Best T&D Associates
Michael M. Noye, M.B.A.
Accounting
Varian Assoc.
Norbert F. Nunes, M.A.*
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Massachusetts Bay Community
College
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Sociology/Anthropology
Fitchburg State College
David H. O'Brien, M.B.A.*
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Sentry Management Holding Corp.
John E. O'Brien, M.B.A.*
Human Resources Management
Massachusetts Hospital
Association
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Information Systems
Massachusetts General Hospital
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Retired
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Lolly Ockerstrom-Snyder, M.A.
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Internal Revenue Service
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Bus-Tech
Edward J. O'Connor, B.A.*
Information Systems
GTE Systems
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Moshe Ofer, M.A.
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Alternative Freshman/Management/
History
R.S.O. Associates
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Information Systems
Digital Equipment Corp.

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Northeastern University
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A.G. Edwards & Sons Inc.
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Northeastern University
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Thomas W. Oliver, Ph.D.
Accounting
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Reed Consulting Group
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First Colonial Bank
- Ronald K. Olson, B.A.***
Information Systems
RKO Systems
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Medical Laboratory Science
Northeastern University
- Tommasina A. Olson, M.B.A.**
Management
Fechtor Detweiler & Co., Inc.
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Technical Communications
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Economics
Dean Junior College
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Medical Laboratory Science
New England Deaconess Hospital
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Speech Communication
Onie Assoc.
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Music
Temple Emanuel
- Gary S. Osmond, M.B.A.**
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Town of Wayland
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The Mitre Corp.
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Laboure College
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Documentation & Design
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Art
Daniel P. Petinge, M.B.A.
Purchasing
Polaroid Corp.
- Elizabeth C. Petrick, M.B.A.**
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First Security Service Corp.
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Advo, Inc.
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Polaroid Corp.
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Blue Cross/Blue Shield
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Division of Employment Security
- Ravi Ramamurti, D.B.A.**
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Finance
Defense Contract Audit Agency
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T. Neil Rantoul, M.F.A.
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MIT Museum
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Norwood Public Schools
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Northeastern University
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Medford Public Schools
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Marlboro High School
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New England Mutual Life Ins. Co.
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Northeastern University
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Curry College
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Northeastern University
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Data Real Estate Management
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Digital Equipment Corp.
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Roger Williams College
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Health Management
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District Court of Concord
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Criminology Research
Commonwealth of Massachusetts
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Digital Equipment Corp.
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Information Systems
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Raytheon
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Town of Bedford Public Schools
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Concentric Data Systems Inc.
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Defense Logistics Agency
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Mintz and Hoke
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The Patriot-Ledger
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Federal Labor Relations Authority
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TTY	373-2825
Burlington Campus	373-5544
All other campuses	373-5544
Downtown Boston Campus	367-6373

Career Services

Career counseling	
job search seminars	
and support services	
Room 124 RY	373-2430
TTY	373-2432

Other Advising Services

Our advising services include educational and personal counseling and vocational testing.

Counseling Center	
Room 302 Ell	373-2142
Testing Center	373-4142

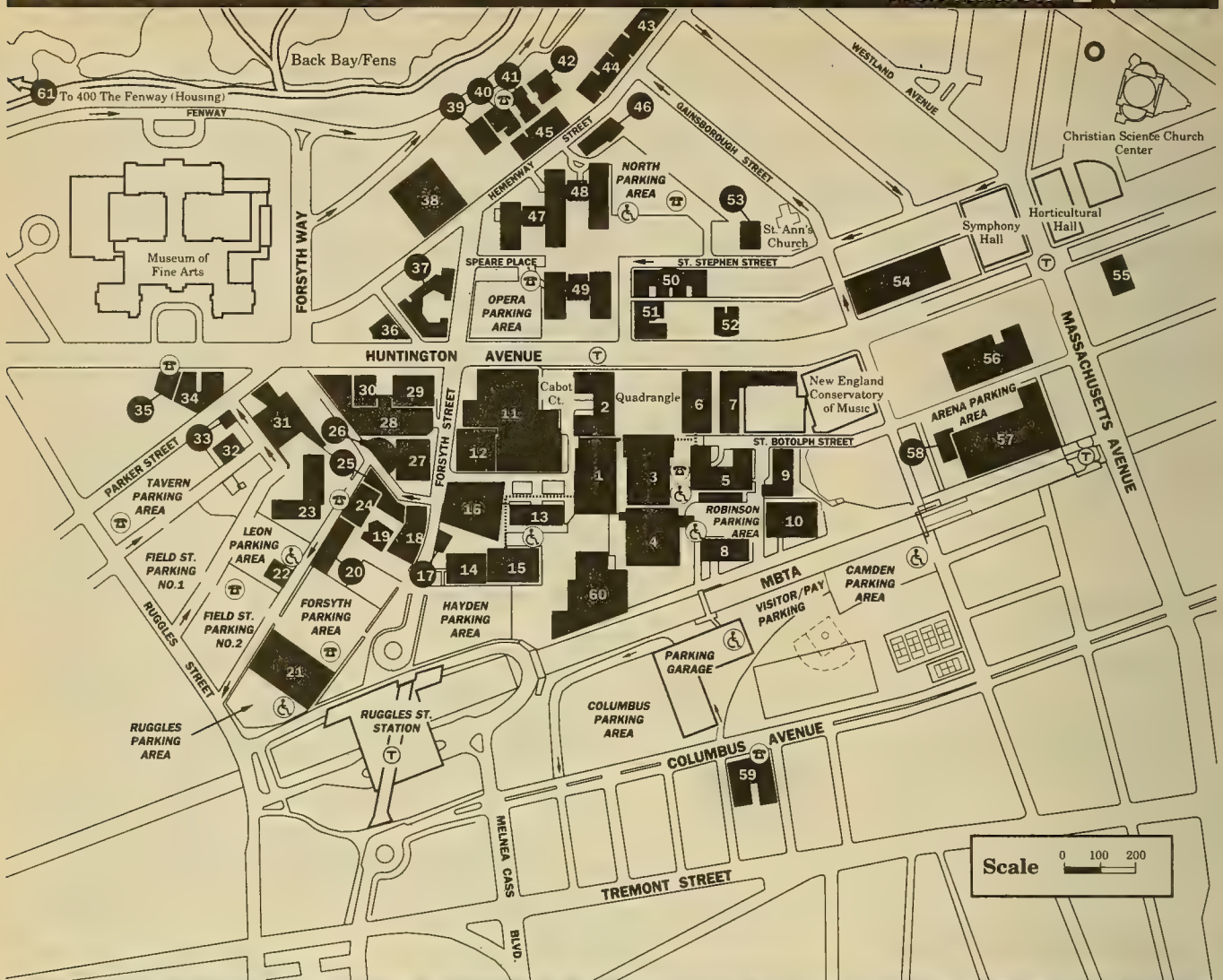


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Bookstore (Boston Main Campus)	
Ell Building	373-2286
Bursar	
Room 254 RI	373-2270
TTY	373-3881
Disability Resource Center	
Room 4 Ell	373-2675
TTY	373-2730
Financial Aid	
Room 356 RI	373-3190
Gym	
Room 100 CB	373-2666
(part-time students may use many of the gym facilities after 4:30 p.m.)	
TTY	373-2733
International Student Office	
Room 270 HO	373-2310
Library	
Circulation	373-2353
Hours (recorded message)	373-4976
TTY	373-3395
NU Events Hot Line	373-3281
Registrar	
Room 120 HA	373-5221
TTY	373-5360
Transcripts	
Room 117 HA	373-5411
University Police	373-2121
TTY	373-3934
Veterans' Services	373-2283

Program Offices

Business Administration	
Room 270 RY	373-2418
Criminal Justice and Security	
Room 266 RY	373-2818
Health Professions and Sciences	
Room 266 RY	373-2818
Liberal Arts	
Room 266 RY	373-2416



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22	African-American Institute (AF)	7	316 Huntington Avenue (Northeastern at the YMCA) (BY)
12	Barletta Natatorium (BN)	54	Huntington Plaza (271 Huntington Avenue) (HN)
19	Boiler Plant	10	Hurtig Hall (HT)
11	Cabot Physical Education Building (CB) TTY: Rm 110	26	Kariotis Hall (KA)
39	Cahners Hall (CA) TTY: Rm 151	41	Kerr Hall (Faculty Center) (KH)
28	Cargill Hall (CG)	29	Knowles Center (KN)
13	Churchill Hall (CH)	25	Lake Hall (LA) TTY: Rm 203
59	Columbus Place (716 Columbus Avenue) (CP)	57	Matthews Arena (MA)
56	Cotting School (CT)	58	Matthews Arena Annex (MX)
9	Cullinane Hall (CN)	20	Meserve Hall (ME) TTY: Rm 305
40	Cushing Hall (CU)	5	Mugar Life Science Building (Peabody Health Professions Center) (MU)
14	Dana Research Center (DA)	18	Nightingale Hall (NI) TTY: Rm 125
27	Dockser Hall (DK) TTY: Rm 107	31	Parker Building (PA)
6	Dodge Building (DB)	2	Richards Hall (RI) TTY: Rms 150, 254
3	Ell Student Building (Auditorium) (EL) TTY: Rms 04, 104	8	Robinson Hall (RB)
4	Ell Student Center (Student Lounge) (EC) TTY: Rm 255	21	Ryder Hall (RY) TTY: Rms 170, 180, 251, 270
16	Forsyth Building (FR) TTY: Rms 100, 135	15	Snell Engineering Center (SN) TTY: Rm 120
17	Forsyth Building Annex (FA)	60	Snell Library (SL) TTY: Reference Desk
38	Forsyth Dental Building (FE)	50	122 St. Stephen Street (SS)
1	Hayden Hall (HA) TTY: Rms 120, 202	30	Stearns Center (ST) TTY: Rm 302
33	Hillel-Frager (HF)	32	26 Tavern Road (TA)
24	Holmes Hall (HO) TTY: Rm 276		
55	236 Huntington Avenue (HU)		

Key

Academic, residential, and service buildings	
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Parking areas	
Street direction	
Underground tunnel	
Emergency telephone	
TTY locations See alphabetic list of buildings for TTY locations.	

Maps are provided by the Information Center, 115 Richards Hall, extension 2736 (TTY extension 3768). Some buildings on this map are used but not owned by Northeastern University. 6/91

Residence Buildings

34	Burstein Hall	42	Melvin Hall
43	Kennedy Hall	35	Rubenstein Hall
46	142-148 Hemenway Street	44	Smith Hall
45	153/157-163 Hemenway Street	49	Speare Hall
7	316 Huntington Avenue (Northeastern at the YMCA)	48	Stetson East TTY (public)
52	319 Huntington Avenue	47	Stetson West
51	337 Huntington Avenue	50	106/110/116/122 St. Stephen Street
36	407 Huntington Avenue	23	Willis Hall
41	Kerr Hall	37	White Hall
53	Light Hall	61	400 The Fenway

Boston Downtown Campus
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Take MBTA to State Street.
Exit at Old State House. Walk
down State St., cross Congress
to Kilby St. Make right at
Stocks and Bonds Restaurant
onto Kilby St. Go to corner of
Water and Kilby Streets (next
to Super Salad).



Burlington Campus
South Bedford Road
Burlington High School
123 Cambridge Street

Burlington Campus

From 128 North or South, take
Exit 33A and follow to South
Bedford Street. Take right at
lights and go 3/10ths mile to
university entrance on your
left.

Burlington High School

From Rte. 128 South to exit
33B (Rte. 3A). Take right at
end of exit ramp. Approx. 1/4
mile to Football Stadium on
left. Take left at lights.
From Rte. 128 North to Exit
33B (Rte. 3A). At end of exit
follow approx. 1/4 mile to
Football Stadium on left and
second set of lights. Take left
at lights.



Chelmsford High School
200 Richardson Road

From Rte. 3 North. Take Exit 32, Drum Hill Rotary. Make the 4th right onto Old Westford Road. Take 1st right onto Graniteville Road. Chelmsford High School is approximately 1/2 mile on your right. Go past high school and take first right onto Richardson Rd. Entrance to parking lot is next to Harrington School.

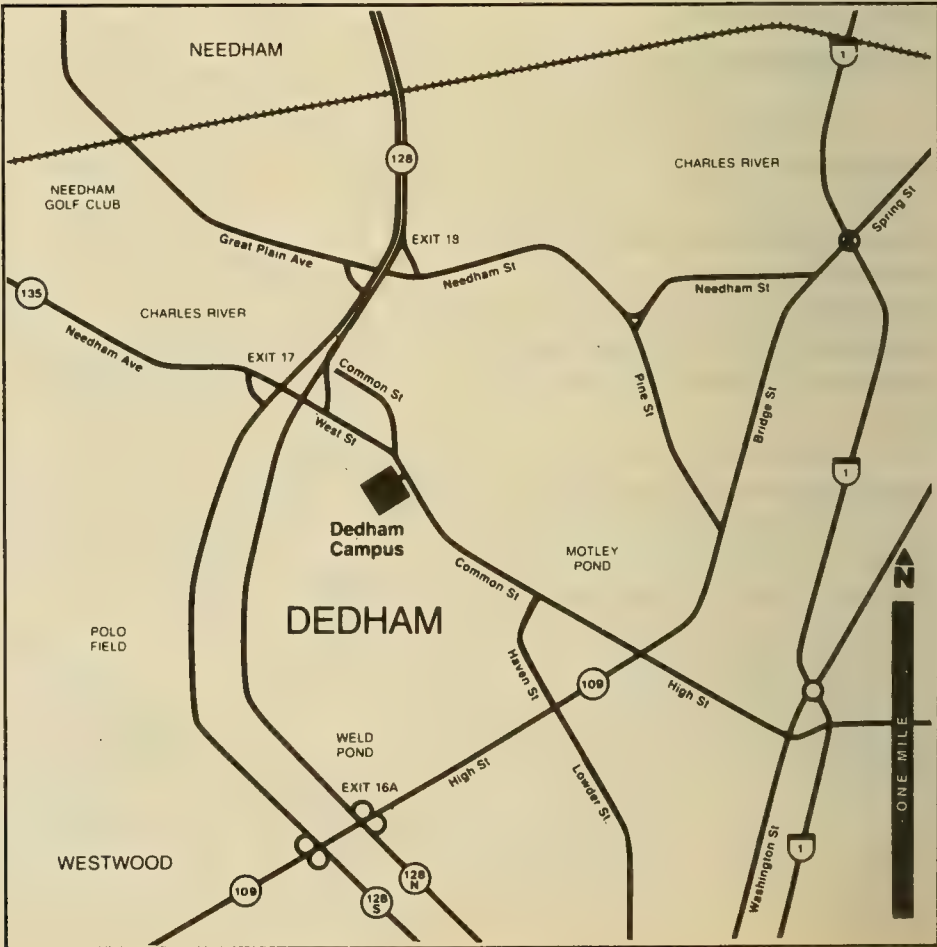
From Route 3 South. Take Exit 32, take first right, Old Westford Road, then same as above.



Dedham Campus
370 Common Street

From Rte. 128 South, take Rte. 135 Exit. Turn right at end of ramp and follow Common St. to campus on the right.

From Rte. 128 North, take Route 135 exit. Turn left at end of ramp and follow Common St. to campus.



Framingham High School
A Street

From Mass Pike going West, take Rte. 30 exit. Bear right after toll booth and take Rte. 30 West to Rte. 126 (Concord St.). Take right onto Rte. 126. Go under Mass. Pike to A Street (left at fork). High School on left.



Malden High School
77 Salem Street

From the North - Take Main Street to Malden Sq. Take a left onto Salem St. at lights. High School is on the right across from the Public Library.

From the East - Take Rt 60 West from Broadway, Malden to Main St. At lights take a right onto Main St. through Malden Sq. At second set of lights take a right onto Salem St. High School is on right across from the Public Library.

From the West - Take Fellsway East to Rt 60 East to Main St. Take a left at Main St. through Malden Sq. At second set of lights take a right onto Salem St. High School is on the right across from the Public Library.

From the South - Take Main St. from Everett Rt 60. At second set of lights from Rt 60, go through Malden Sq.; take a right onto Salem St. High School is on right across from the Public Library.



Marlboro High School
Bolton Street

From Rte. 495 North to Exit 25, Rte. 290 Ext. Take exit and follow Rte. 290 Ext. to Rte. 85. Take right on Rte. 85 (Bolton St.) to Navin Skating Rink. Make first left after rink. High School is on left.



Marshfield High School
Forest Street

From Route 3, going North or South, take exit 12 and follow School St. to Forest St. Take a right onto Forest St. and the high school is located on the right just before you reach Furnace St.



Milford High School

31 West Fountain Street

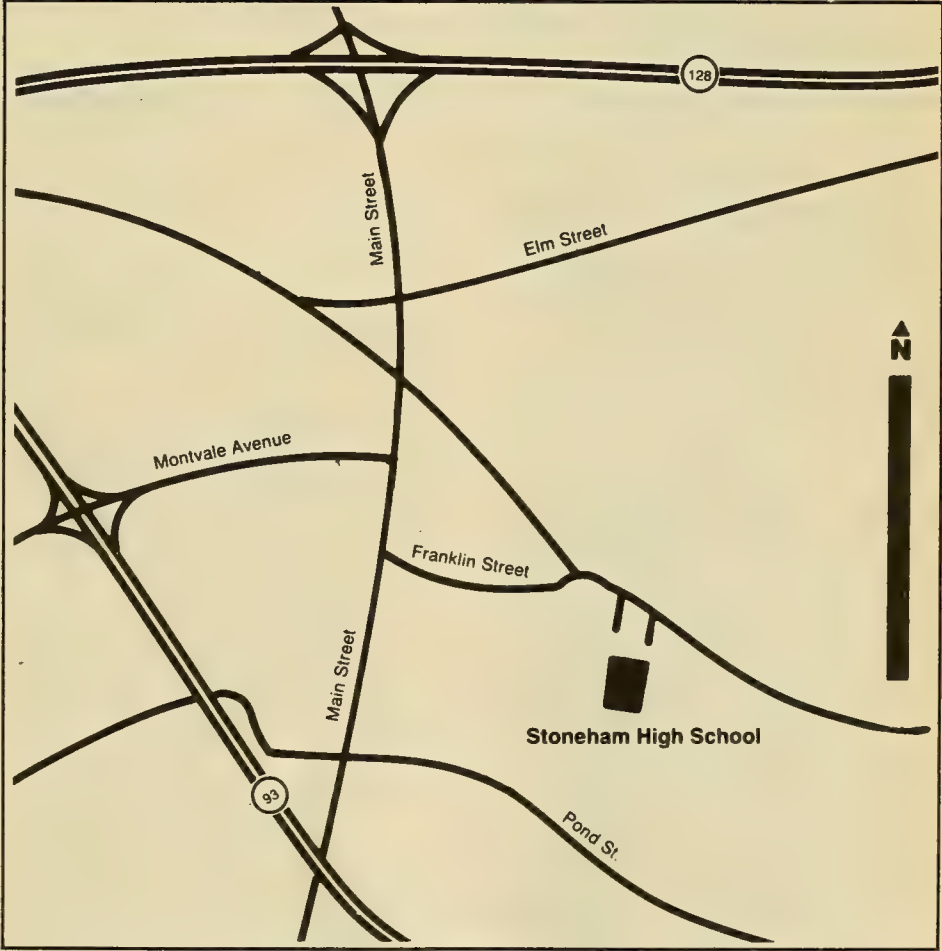
- 1. From Mass Pike and Rte. 9 to 495 South, Exit 20 to Cedar St. to Dilla St. to Purchase St. to Fountain St. to West Fountain St. to Milford High School.
- 2. From Rte. 140 past Milford Hospital. Go 1 mile; pass Shaw's Supermarket and Hills Shopping Plaza. Take right at island and proceed across West St. to Highland St., 3/4 mile to overhead blinking light. Take right onto West Fountain St. to High School.
- 3. From Rte. 109 to intersection with Rte. 16. Proceed through Milford (approx. 3 miles to Milford Hospital and Rte. 140). Take right at Milford Hospital and proceed as in step #2.



Stoneham High School

Franklin Street

- From Rte. 128. Take Rt. 28 South, Stoneham Exit at 6th light, Stoneham Square. Take left onto Franklin St. High School is about 8/10 of a mile on the right.
- From Rt. 93 North. Take Rte. 28 Stoneham/Melrose Exit. At 3rd light, Stoneham Square, take right onto Franklin St. High School is about 8/10 of a mile on right.



Westwood High School

200 Nahatan Street

From Rte. 128 North take Rte. 109 Exit. Go west after exit on Rte. 109 to Nahatan St. on left. Take Nahatan St. to high school on left.

From Rte. 128 South take Rte. 109 Exit. Follow above directions on Rte. 109.



Weymouth Junior High School

360 Pleasant Street

From Rte. 3 Heading North. Take exit 16. At top of ramp take a left. Go up hill and continue through traffic lights. At next set of lights, turn left. Turn left again at next set of lights. South Junior High School is the second school you will see on your left.

From Rte. 3 Heading South. Take exit 16B. Proceed through traffic lights at top of hill. Take a left at next set of traffic lights. At next set of traffic lights turn left. South Junior High School is the second school on your left.

From Rte. 18 Heading North. Continue past Pleasant Shops and South Shore Hospital (both on your right). Take a right at the first set of traffic lights after the South Shore Hospital. At next set of traffic lights turn left. South Junior High School is the second school you will see on your left.



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Northeastern University is dedicated to providing a diverse student population with an academic program and a course of professional preparation of the highest quality. The University values equally knowledge for its own sake, knowledge as a means to success in the workplace, and knowledge as a cornerstone of personal achievement and satisfaction. As a private, urban university committed to reinforcing the links between the academy and society, Northeastern is determined to maintain its reputation as a friend of the city of Boston and a partner of the Commonwealth of Massachusetts.

The Northeastern University *University College Bulletin* contains the University's primary statements about these academic programs and degree and certificate requirements, as authorized by the president or Board of Trustees. For information about other academic policies and procedures; student responsibilities, academic and cocurricular life; faculty rights and responsibilities; or general personnel policies, benefits, and services, please refer to the *Academic Operations Manual*, *Undergraduate and Graduate Student Handbook*, *Cooperative Education Handbook*, *Faculty Handbook*, *Benefits and Services Handbook*, and related procedural guides as appropriate.

The *University College Bulletin* should be used in conjunction with the *Undergraduate Catalogue*, *Undergraduate and Graduate Student Handbook*, *Cooperative Education Handbook*, and other procedural guides which contain Northeastern University's primary statements about academic programs, policies, and procedures; degree requirements; student responsibilities; and general personnel policies, benefits, and services.

Accreditation

Northeastern University is accredited by the New England Association of Schools and Colleges, Inc., which accredits schools and colleges in the six New England states.

Accreditation by the Association indicates that the institution has been carefully evaluated and found to meet standards agreed upon by qualified educators. The undergraduate business programs offered by Northeastern University are accredited by the American Assembly of Collegiate Schools of Business.

Delivery of Services

Northeastern University assumes no liability for delay or failure to provide educational or other services or facilities due to causes beyond its reasonable control. Causes include, without limitation, power failure, fire, strikes by University employees or others, damage by natural elements, and acts of public authorities. The University will, however, exert reasonable efforts, when it judges them to be appropriate, to provide comparable services, facilities, or performance; but its inability or failure to do so shall not subject the University to liability.

The *Northeastern University Undergraduate Catalogue* contains current information about the University calendar, admissions, degree requirements, fees, and regulations; however, such information is not intended and should not be regarded to be contractual.

Northeastern University reserves the sole right to promulgate and change rules and regulations and to make changes of any nature in its program, calendar, admissions policies, procedures, and standards, degree requirements, fees, and academic schedule whenever necessary or desirable, including, without limitation, changes in course content and class schedule, the cancellation of scheduled classes and other academic activities, and the substitution of alternatives for scheduled classes and other academic activities. In any such case, the University will give whatever notice is reasonably practical.

Northeastern University will endeavor to make available to its students a fine education and a stimulating and congenial environment. However, the quality and rate of progress of an individual's academic career and professional advancement upon completion of a degree or program are largely dependent on his or her own abilities, commitment, and effort. In many professions and occupations there are also requirements imposed by federal and state statutes and regulatory agencies for certification or entry into a particular field. These requirements may change while a student is enrolled in a program and may vary from state to state or country to country. Although the University stands ready to help its students find out about requirements and changes in them, it is the student's responsibility to initiate the inquiry.

Disability Resource Center

The Disability Resource Center provides a variety of disability-related services and accommodations to Northeastern University's students and employees with disabilities.

Northeastern University's compliance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 are coordinated by the Dean and Director of the Disability Resource Center. Persons requiring information regarding the Disability Resource Center should contact Dean G. Ruth Bork at 617-373-2675 or TTY 617-373-2730.

Disclaimer

Tuition rates, all fees, rules and regulations, and courses and course content are subject to revision by the President and the Board of Trustees at any time.

Emergency Closing of the University

Northeastern University has made arrangements to notify students, faculty, and staff by radio when it becomes necessary to cancel classes because of extremely inclement weather. AM radio stations WBZ (1030), WEEI (590), WHDH (850), WRKO (680), and FM stations WBCN (104.1) and WBMX (98.5) are the stations authorized to announce the University's decision to close. Since instructional television courses originate from live or broadcast facilities at the University, neither the classes nor the courier service operate when the University is closed. You are encouraged to listen to the radio to determine whether the University will be closed.

If a storm occurs at night, the announcement of University closing is given to the radio stations at approximately 6:00 a.m. Classes are generally cancelled for the entire day and evening at all campus locations unless stated otherwise. When a storm begins later in the day, cancellations of evening classes may be announced. This announcement is usually made between 2:00-3:00 p.m.

Equal Opportunity Policy

Northeastern University does not discriminate on the basis of race, color, religion, sex, sexual orientation, age, national origin, disability, or veteran status in admission to, access to, treatment in, or employment in its programs and activities. In addition, Northeastern University will not condone any form of sexual harassment. Handbooks containing the University's nondiscrimination policies and its grievance procedures are available in the Office of Affirmative Action, 175 Richards Hall. Inquiries regarding the University's nondiscrimination policies may be directed to:

Ellen S. Jackson, Dean/Director
Office of Affirmative Action
175 Richards Hall
Northeastern University
Boston, Massachusetts 02115
617-373-2133

Inquiries concerning the application of nondiscrimination policies may also be referred to the Regional Director, Office for Civil Rights, United States Department of Education, J.W. McCormack Building, Post Office Court House, Room 222, Boston, Massachusetts 02109-4557.

Family Educational Rights and Privacy Act

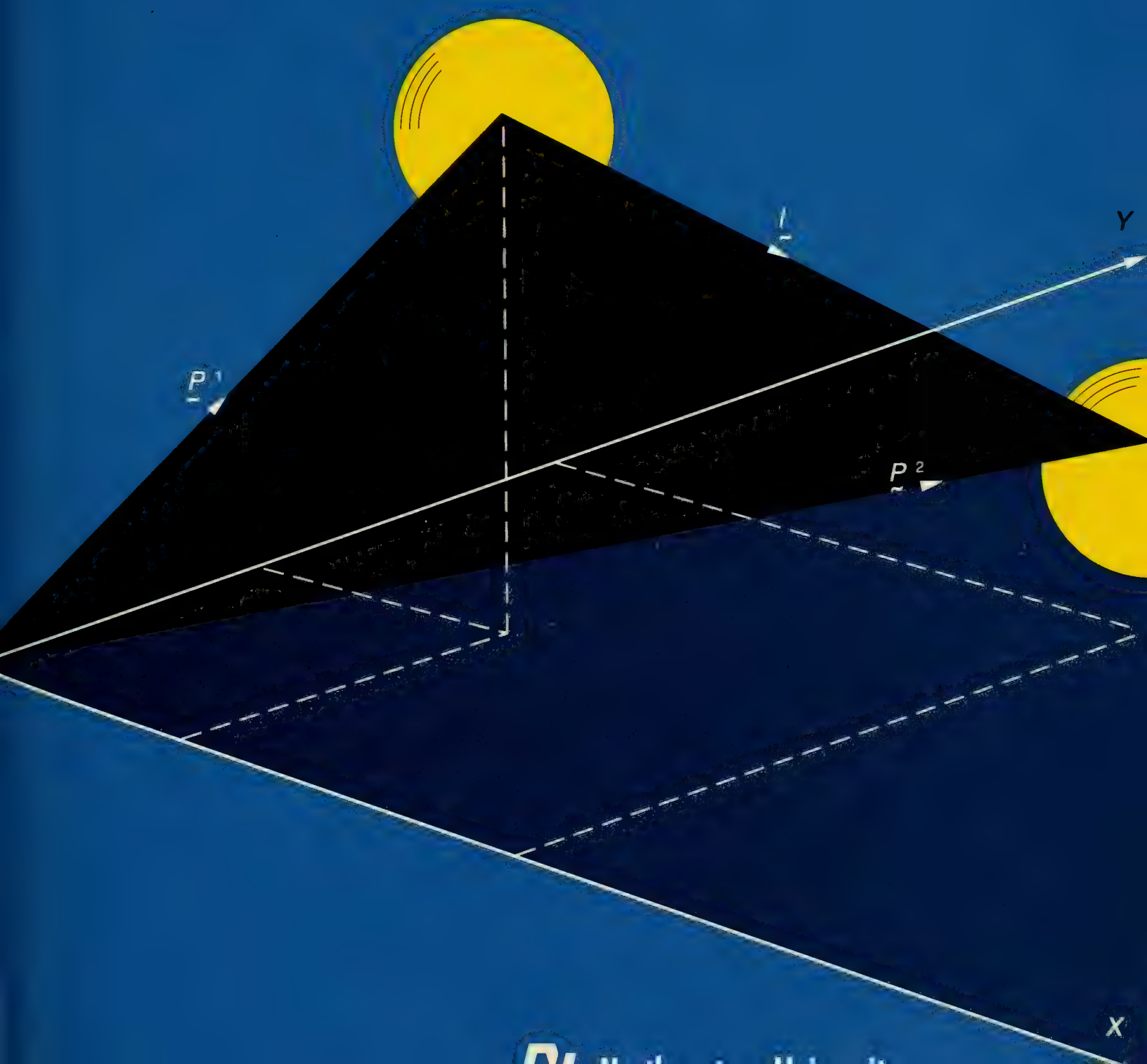
In accordance with the Family Educational Rights and Privacy Act of 1974, Northeastern University permits its students to inspect their records wherever appropriate and to challenge specific parts of them when they feel it necessary to do so. Specific details of the law as it applies to Northeastern are printed in the *Undergraduate and Graduate Student Handbook* and are distributed annually at registration of the University's colleges and graduate schools.

Tuition Default Policy

In cases where the student defaults on his/her tuition, the student shall be liable for the outstanding tuition and all reasonable associated collection costs incurred by the University, including attorneys' fees. The student's grades will be withheld until all outstanding costs are paid.

Burlington High School
Stoneham • Marlboro
Dedham • Framingham
Westwood • Weymouth
Downtown Boston • Malden
Burlington • Chelmsford
Marshfield • Milford
Boston Main Campus
Burlington High School
Stoneham • Marlboro
Dedham • Framingham

Bulletin 1992 | 1994



Summer Quarter 1994

Registration for entire quarter		Monday-Thursday, June 6-9
Summer quarter classes begin		Monday, June 20
Independence Day observed		Monday, July 4
Registration for second five-week term		Monday-Tuesday, July 11-12
Second summer quarter begins		Monday, July 25
Labor Day observed	No classes	Monday, September 5
Final examination period for summer quarter		Held during last class session each term

Fee Schedule

Tuition Related Fees

Fee

Tuition*	\$160.00 per quarter hour
Late payment fee	\$ 75.00
Student Center fee (main campus only)	\$ 8.25 per quarter

*University College courses are offered at \$140.00 per quarter hour.

Other Fees

Fee

Makeup final exam fee	\$50.00
Official transcript fee	\$ 2.00 per copy
Parking decal fee	\$40.00 per year
Proficiency examination fee	\$50.00
Registration fee (first-time students only)	\$10.00

Northeastern University

School of Engineering Technology

Registration Schedule 1993-1994

Each day listed in the Registration Schedule is followed by a letter code in parentheses. This code indicates the registration times for that particular day. A key for the codes is printed on the last line of the schedule.

Place of Registration	Fall 1993	Winter 1994	Spring 1994	Summer 1994
Boston campus*	Tuesday-Friday(b) September 7-10	Monday-Thursday(b) December 6-9	Monday-Thursday(b) March 14-17	Registration for entire summer quarter Monday-Thursday(b) June 6-9
	Saturday(a) September 11			
	Monday-Wednesday(b) September 13-15			Registration for second five-week term Monday-Tuesday(b) July 11-12
Burlington campus*	Wednesday-Thursday(c) September 8-9	Monday-Wednesday(c) December 6-8	Monday-Wednesday(c) March 14-16	Registration for entire summer quarter Monday-Wednesday(c) June 6-8
	Friday(d) September 10			
	Monday-Tuesday(c) September 13-14			Registration for second five-week term Monday July 11(c)
Chelmsford High School	Thursday(c) September 9 and Tuesday(c) September 14	Tuesday(c) December 7	Tuesday(c) March 15	
Dedham campus*	Thursday(c) September 9 and Monday(c) September 13	Monday-Wednesday(c) December 6-8	Monday-Wednesday(c) March 14-16	
Framingham High School	Tuesday(c) September 7 Monday(c) September 13	Monday-Wednesday(c) December 6-8	Monday-Wednesday(c) March 14-16	

Registration Schedule Continued

(See reverse side for Academic Calendar and Fee Schedule.)

Place of Registration	Fall 1993	Winter 1994	Spring 1994
Liberty Square (Downtown Boston)	Tuesday- Thursday(e) September 7-9 Monday- Tuesday(e) September 13-14	Monday- Wednesday(e) December 6-8	Monday- Wednesday(e) March 14-16
Malden High School	Wednesday(c) September 8 and Monday(c) September 13	Monday(c) December 6	Monday(c) March 14
Marlborough High School*	Wednesday(c) September 8 and Monday(c) September 13	Monday(c) December 6	Monday(c) March 14
Marshfield High School	Thursday(c) September 9 Tuesday(c) September 14	Tuesday(c) December 7	Tuesday(c) March 15
Milford High School	Thursday(c) September 9 Tuesday(c) September 14	Tuesday(c) December 7	Tuesday(c) March 15
Stoneham High School	Thursday(c) September 9 Tuesday(c) September 14	Tuesday(c) December 7	Tuesday(c) March 15
Westwood High School	Thursday(c) September 9 Tuesday(c) September 14	Monday- Wednesday(c) December 6-8	Monday- Wednesday(c) March 14-16
Weymouth Junior High School	Wednesday(c) September 8 Monday(c) September 13	Monday- Wednesday(c) December 6-8	Monday- Wednesday(c) March 14-16

(a)9:00 AM-Noon (b)9:30 AM-7:00 PM (c)5:30 PM-8:00 PM (d)4:00 PM-8:00 PM (e)11:00 AM-7:00 PM

*Counselors available at these locations only.

Northeastern University

School of Engineering Technology

Academic Calendar 1993-1994

Fall Quarter 1993

Registration		Tuesday-Wednesday, September 7-15
Fall quarter classes begin		Monday, September 27
Columbus Day observed	No classes	Monday, October 11
Veterans Day observed	No classes	Thursday, November 11
Thanksgiving recess	No classes	Thursday-Saturday, November 25-27
Final examination period for fall quarter		Monday-Saturday, December 13-18
Christmas vacation	No classes	Monday-Saturday, December 20-January 1

Winter Quarter 1994

Registration		Monday-Thursday, December 6-9
Winter quarter classes begin		Monday, January 3
Martin Luther King, Jr.'s Birthday observed	No classes	Monday, January 17
Presidents Day observed	No classes	Monday, February 21
Final examination period for winter quarter		Monday-Saturday, March 21-26
Spring recess (or makeup period for snow days)		Monday-Saturday, March 28-April 2

Spring Quarter 1994

Registration		Monday-Thursday, March 14-17
Spring quarter classes begin		Monday, April 4
Patriots Day observed	No classes	Monday, April 18
Memorial Day observed	No classes	Monday, May 30
Final examination period for spring quarter		Monday-Saturday, June 13-18
Commencement		Saturday, June 18

Summer Quarter 1994

Registration for entire quarter		Monday-Thursday, June 6-9
Summer quarter classes begin		Monday, June 20
Independence Day observed		Monday, July 4
Registration for second five-week term		Monday-Tuesday, July 11-12
Second summer quarter begins		Monday, July 25
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Northeastern University

School of Engineering Technology

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(See reverse side for Academic Calendar and Fee Schedule.)

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Northeastern University

School of Engineering Technology

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Registration		Monday-Thursday, March 14-17
Spring quarter classes begin		Monday, April 4
Patriots Day observed	No classes	Monday, April 18
Memorial Day observed	No classes	Monday, May 30
Final examination period for spring quarter		Monday-Saturday, June 13-18
Commencement		Saturday, June 18

**Northeastern
University**

**School of
Engineering Technology**

**Bulletin
1992–1994**

120 Snell Engineering Center
Boston, Massachusetts 02115

Telephone: 617-437-2500
Fax: 617-437-2501

About the cover.

The cover shows a complex graph depicting collision avoidance based on two spheres. "Real-time collision avoidance in two-armed robotic systems," R. G. Beaumont and R. M. Crowder. *Computer-Aided Engineering Journal*, Vol. 8, No. 6, December 1991. Used by permission. IEE Publishing Department, Michael Faraday House, Six Hills Way, Stevenage, Herts., England.

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About This Bulletin

This *Bulletin* offers information about the evening and weekend programs available at Northeastern University's School of Engineering Technology. (If you are interested in Northeastern University's full-time day programs, call the Office of Undergraduate Admissions, 617-437-2200.)

For prospective students, we hope that after reading this publication you'll agree that a career in engineering technology can be exciting and challenging. As you'll soon discover, our evening and weekend programs are designed to enable you to pursue a career and an education at the same time.

Students already attending the School of Engineering Technology use the *Bulletin* as an important guide to the resources and policies of the University. In addition, students use the degree program descriptions to plan and track their academic careers.

The *School of Engineering Technology Bulletin* is divided into two parts: "Teaching Tomorrow's Technologists Today" and "Northeastern University."

"Teaching Tomorrow's Technologists Today" defines engineering technology and introduces you to the School of Engineering Technology. This section also contains descriptions of each program and course we offer.

The "Northeastern University" section reviews the benefits—the services and resources—that attending a large private university provides. We present the University's administrative and academic policies, as well as financial aid and scholarship opportunities.

Taking the Next Step

Because the evening and weekend technology programs have an open enrollment policy, you can register for courses without formally applying for admittance to a program. In fact, our students earn sixteen credits before petitioning for entrance to a program. If you are a transfer student, you may already be eligible to matriculate. For more details, carefully review the "Admissions" section. (See page 57.)

A Fee Schedule and Academic Calendar should have been enclosed with this *Bulletin*. The insert includes the current academic calendar, registration dates, and a list of the University's fees.

Before registration begins, obtain a copy of the *University College and School of Engineering Technology Schedule* for the next academic quarter. The *Schedule* indicates which courses will be offered each quarter, as well as when and where they will meet. Note that, since not all courses are offered every quarter, you must plan your course load for the coming academic year, not just the next quarter, by referring to the program and course descriptions contained in this *Bulletin* and obtaining a copy of the *Tentative Part-Time Schedule* published annually. For more details, review the "Registration" section. (See page 59.)

Finding Additional Help

If you have any questions, or are missing any of the forms mentioned in this *Bulletin*, call the School of Engineering Technology office, 617-437-2500.

Teaching Tomorrow's Technologists Today

I



An Introduction to Engineering Technology

What is engineering technology?

Engineering technology is the application of engineering principles and modern technology to help solve or prevent technical problems.

Engineering technology is a relatively new discipline. Before engineering technology programs like Northeastern's emerged, people with scientific or technical ambitions had a difficult decision to make: what kind of education should they pursue? College-bound students had three choices.

Choice number one was selecting a major from among the pure sciences: physics, chemistry, or biology. However, these majors are only appropriate for people interested in pursuing additional degrees, laboratory research, or careers in education.

The second choice was selecting from among the engineering science majors: civil engineering, electrical engineering, or mechanical engineering. But engineering requires highly developed analytical skills, and prepares people for careers conceptualizing and designing technical devices or systems.

The third choice was deciding not to attend college, but to enroll in a technical or vocational school. This route is best suited for people interested in the trades: that is, for people who want careers physically building or repairing machinery.

Engineering technology curricula introduced a fourth option. The programs are designed to meet the growing need created by the technological revolution for college-educated problem solvers who can support the engineering process by bridging the gap between the blueprints and the production line. These men and women can help engineers and tradespeople work effectively together.

Engineering technology programs include scientific and engineering principles relevant to your chosen field: you will come to understand why a system is designed in a particular fashion and how it works. This educational focus is often absent from a technical or vocational school education.

In addition, engineering technology students acquire hands-on technical skills that enable them to solve production and system implementation problems, and help them explain solutions to tradespeople.

Who are engineering technologists?

People who are part of the technology workplace include scientists, engineers, technologists, technicians, and tradespeople. All of these people have specialized education or training beyond the high-school level and often work together as a team. As on any team, the players have different but important roles.

Scientists are concerned with advancing our understanding of the laws of nature and our knowledge of scientific principles. The scientist is primarily involved with research.

Engineers employ the scientific knowledge developed by scientists in planning, designing, and constructing technical devices and systems. The engineer is a developer of technological innovations.

Engineering technologists work closely with engineers in coordinating people, material, and machinery in order to achieve the specific goals of a particular project. The engineering technologist often ensures that the engineer's designs and instructions are implemented efficiently and according to accepted practices.

School of Engineering Technology

You have a special kind of ambition that allows you to work full-time and attend the University after hours. The faculty and administration of the School of Engineering Technology share, admire, and respect your desire for professional and personal growth through higher education. We are as committed as you. We can help you achieve your goals.

When you enroll in the School of Engineering Technology, you are entering one of the oldest and finest undergraduate engineering technology programs in the country. Northeastern University established its first engineering technology program within the Polytechnic School in 1916. During 1926, the program was reorganized under a new entity within Northeastern: Lincoln Institute, later changed to Lincoln College. The program's most recent transformation occurred in 1984, when Lincoln College became the School of Engineering Technology.

Today's School of Engineering Technology is a unit of Northeastern University's College of Engineering. Although we offer courses at several locations and through the University's television system, Network Northeastern, our central offices are in the Snell Engineering Center on the Boston campus.

All of our engineering technology programs require laboratory courses that are conducted in facilities on the Boston campus. We've done our best to ensure that you can get the most out of these courses by equipping our laboratories with the latest available technology. We continue to acquire laboratory equipment that allows us to conduct experiments that were until recently impractical or impossible.

As a student at Northeastern's School of Engineering Technology, you are taught by

faculty whose impressive professional experience can provide you with practical insights into the field.

In addition to the many resources offered to you as a School of Engineering Technology student, you are a fully vested member of the Northeastern University community. As such, you are invited to take advantage of the many assets the University provides. We encourage you to read the "Profile of Northeastern" section of this *Bulletin* for details of the University's facilities.

The School of Engineering Technology offers day programs in engineering technology to full-time students, as well as the evening and weekend programs described in this publication. All of our programs are at the undergraduate level, leading to either an associate's or bachelor's degree or to a certificate.

Our evening and weekend degree programs span the following areas of concentration.

- Civil engineering technology, including environmental, mechanical-structural, structural, and surveying and highway engineering technology
- Computer technology
- Electrical engineering technology
- Manufacturing engineering technology
- Mechanical engineering technology, including aerospace maintenance engineering technology
- Telecommunications

We welcome your interest in Northeastern's School of Engineering Technology. In the following pages, you can learn about the specifics of each of our programs.

Degree Program Descriptions

Overview

This section gives a description of each program offered by the School of Engineering Technology. Accompanying each description are specimen curricula for the majors offered within the specific program. The specimens list the degree's required courses and the sequence in which you should complete them. The specimens assume that you will initially enroll in courses during the fall quarter. If you are a transfer student, take

time off, or begin the program in a different quarter, please meet with one of our academic advisers. The adviser will help you take courses in a sequence that is academically sound and that will fulfill your degree program's graduation requirements. For more information about the program descriptions and curricula, contact an adviser at 617-437-2500.

Civil Engineering Technology Programs

Civil engineering professionals plan and construct a variety of structures and public works. The civil engineering technologist's major functions include preparing surveys (topographical, geological, traffic); designing structures (buildings, bridges, dams); planning municipal systems (water, sewers, flood control); and developing transportation facilities (highways, railways, waterways).

We offer associate's degree programs in environmental engineering technology; structural engineering technology; and surveying and highway engineering technology. A bachelor's degree program in mechanical-structural engineering technology is also offered.

The associate's degree program in environmental engineering technology offers you the opportunity to prepare for responsibilities related to designing, constructing, and supervising municipal plants and systems that control the storage and distribution of water. Students may also prepare for responsibilities associated with the disposal of sewage and waste in urban areas, with an emphasis on preventing contamination and pollution. Career opportunities are with town, city, and state public works departments, private engineering consultants, architects, contractors, and engineering firms.

The associate's degree program in structural engineering technology offers the opportunity to

prepare for planning, designing, and supervising the construction of buildings, bridges, foundations, flood-control projects, and other fixed structures. Professional opportunities include consulting engineering firms, architectural groups, contractors, railroads, government agencies, and the military.

The associate's degree program in surveying and highway engineering technology offers opportunities in the preparation and calculation of preliminary and legal surveys required for both basic and complex projects. These projects can include subdivision work, individual lot layouts, highway layouts, and projects relating to sewer systems, pipelines, power transmission lines, dams, reservoirs, and aqueducts. Career opportunities are with independent surveying companies, civil engineering companies, highway transit, railroad planning groups, cartographers, construction companies, and contractors.

The bachelor's degree program in mechanical-structural engineering technology offers opportunities to prepare for both the planning and constructing of structures such as buildings, bridges, and docks, and designing and producing dynamic machine tools, machinery, and other mechanical devices. Career opportunities are with architectural, construction, civil, and mechanical professions and companies.

Environmental Engineering Technology
(Major Code 011)

The Environmental Engineering Technology Program leads to the associate in engineering degree. Degree candidates must

earn 101 credits by completing the following four-year curriculum.

First-Year Courses	Fall	GET	4170	Engineering Graphics 1
		MTH	4107	College Algebra
	Winter	GET	4171	Engineering Graphics 2
		MTH	4108	Pre-Calculus
	Spring	GET	4100	Computer Programming for Engineering Technology
		MTH	4120	Calculus 1
Second-Year Courses	Fall	MTH	4121	Calculus 2
		PHY	4117	Physics 1
		PHY	4196	Physics Lab 1
	Winter	ENG	4110	Critical Writing 1
		PHY	4118	Physics 2
		PHY	4197	Physics Lab 2
	Spring	GET	4306	Technical Communications
		PHY	4119	Physics 3
		PHY	4198	Physics Lab 3
Third-Year Courses	Fall	CHM	4111	General Chemistry 1
		ECN	4115	Economic Principles and Problems 1
		MET	4301	Mechanics A
	Winter	ECN	4116	Economic Principles and Problems 2
		ENG	4111	Critical Writing 2
		MET	4314	Stress Analysis A
	Spring	MET	4315	Stress Analysis B
		MET	4370	Fluid Mechanics A
Fourth-Year Courses	Fall	CET	4324	Structural Analysis 1
		CET	4361	Materials and Soil Mechanics
	Winter	CET	4350	Environmental 1
		CET	4371	Concrete Design 1
	Spring	CET	4351	Environmental 2
		CET	4393	Construction Administration

Mechanical-Structural Engineering Technology

(Major Code 015)

The Mechanical-Structural Engineering Technology Program leads to the bachelor of science in engineering technology degree. The program is accredited by the Technology

Accreditation Commission of the Accreditation Board for Engineering and Technology. Degree candidates must earn at least 187 credits by completing the following seven-year curriculum.

First-Year Courses	Fall	GET	4170	Engineering Graphics 1
		MTH	4107	College Algebra
	Winter	GET	4171	Engineering Graphics 2
		MTH	4108	Pre-Calculus
	Spring	GET	4100	Computer Programming for Engineering Technology
		MTH	4120	Calculus 1
Second-Year Courses	Fall	MTH	4121	Calculus 2
		PHY	4117	Physics 1
		PHY	4196	Physics Lab 1
	Winter	ENG	4110	Critical Writing 1
		PHY	4118	Physics 2
		PHY	4197	Physics Lab 2
	Spring	GET	4306	Technical Communications
		PHY	4119	Physics 3
		PHY	4198	Physics Lab 3
Third-Year Courses	Fall	CHM	4111	General Chemistry 1
		MET	4301	Mechanics A
		MTH	4122	Calculus 3
	Winter	MET	4302	Mechanics B
		MET	4314	Stress Analysis A
	Spring	MET	4370	Fluid Mechanics A
		MET	4380	Materials A
Fourth-Year Courses	Fall	ECN	4115	Economic Principles and Problems 1
		MET	4315	Stress Analysis B
		MET	4390	Measurement and Analysis Lab
	Winter	ENG	4111	Critical Writing 2
		MET	4371	Fluid Mechanics B
		MET	4391	Technology Lab A
	Spring	CET	4321	Introduction to Structural Design
		MET	4392	Technology Lab B
		(	)	Social Science/Humanities Elective

Fifth-Year Courses

<i>Fall</i>	CET	4324	Structural Analysis 1
	MET	4303	Mechanics C
<i>Winter</i>	CET	4325	Structural Analysis 2
	(	)	Technical Elective
<i>Spring</i>	CET	4331	Steel Design 1
	(	)	Technical Elective

Sixth-Year Courses

<i>Fall</i>	CET	4332	Steel Design 2
	(	)	Social Science/Humanities Elective
	(	)	Social Science/Humanities Elective
<i>Winter</i>	CET	4371	Concrete Design 1
	(	)	Social Science/Humanities Elective
	(	)	Technical Elective
<i>Spring</i>	CET	4372	Concrete Design 2
	(	)	Technical Elective

Seventh-Year Courses

<i>Fall</i>	SPC	()	Communication Elective
	(	)	Social Science/Humanities Elective
	(	)	Technical Elective
<i>Winter</i>	MET	4330	Mechanical Design A
	SPC	()	Communication Elective
	(	)	Technical Elective
<i>Spring</i>	MET	4331	Mechanical Design B
	(	)	Open Elective
	(	)	Social Science/Humanities Elective

Suggested Technical Electives

CET	4301	Plane Surveying
CET	4302	Geodetic Surveying
CET	4303	Route Surveying
CET	4311	Highway Engineering
CET	4350	Environmental 1
CET	4351	Environmental 2
CET	4361	Materials and Soil Mechanics
CET	4393	Construction Administration
EET	4320	Electricity and Electronics
IIS	4360	Engineering Economy
IIS	4393	Engineering Probability and Statistics
MET	4340	Thermodynamics A
MET	4414	Mechanical Vibrations
MET	4416	Stress Analysis C
MET	4481	Materials B
MET	4482	Applied Metallurgy

Structural Engineering Technology (Major Code 012)

The Structural Engineering Technology Program leads to the associate in engineering degree.

Degree candidates must earn 101 credits by completing the following four-year curriculum.

First-Year Courses	Fall	GET	4170	Engineering Graphics 1
		MTH	4107	College Algebra
	Winter	GET	4171	Engineering Graphics 2
		MTH	4108	Pre-Calculus
	Spring	GET	4100	Computer Programming for Engineering Technology
		MTH	4120	Calculus 1
Second-Year Courses	Fall	MTH	4121	Calculus 2
		PHY	4117	Physics 1
		PHY	4196	Physics Lab 1
	Winter	ENG	4110	Critical Writing 1
		PHY	4118	Physics 2
		PHY	4197	Physics Lab 2
	Spring	GET	4306	Technical Communications
		PHY	4119	Physics 3
		PHY	4198	Physics Lab 3
Third-Year Courses	Fall	CHM	4111	General Chemistry 1
		ECN	4115	Economic Principles and Problems 1
		MET	4301	Mechanics A
	Winter	ECN	4116	Economic Principles and Problems 2
		ENG	4111	Critical Writing 2
		MET	4314	Stress Analysis A
	Spring	CET	4321	Introduction to Structural Design
		MET	4315	Stress Analysis B
Fourth-Year Courses	Fall	CET	4324	Structural Analysis 1
		CET	4361	Materials and Soil Mechanics
	Winter	CET	4325	Structural Analysis 2
		CET	4371	Concrete Design 1
	Spring	CET	4331	Steel Design 1
		CET	4393	Construction Administration

Surveying and Highway Engineering
Technology (Major Code 013)

The Surveying and Highway Engineering Technology Program leads to the associate in engineering degree. Degree candidates must

earn 101 credits by completing the following four-year curriculum.

First-Year Courses	Fall	GET	4170	Engineering Graphics 1
		MTH	4107	College Algebra
	Winter	GET	4171	Engineering Graphics 2
		MTH	4108	Pre-Calculus
	Spring	GET	4100	Computer Programming for Engineering Technology
		MTH	4120	Calculus 1
Second-Year Courses	Fall	MTH	4121	Calculus 2
		PHY	4117	Physics 1
		PHY	4196	Physics Lab 1
	Winter	ENG	4110	Critical Writing 1
		PHY	4118	Physics 2
		PHY	4197	Physics Lab 2
	Spring	GET	4306	Technical Communications
		PHY	4119	Physics 3
		PHY	4198	Physics Lab 3
Third-Year Courses	Fall	CHM	4111	General Chemistry 1
		ECN	4115	Economic Principles and Problems 1
		MET	4301	Mechanics A
	Winter	ECN	4116	Economic Principles and Problems 2
		ENG	4111	Critical Writing 2
		MET	4314	Stress Analysis A
Fourth-Year Courses	Fall	CET	4301	Plane Surveying
		CET	4316	Land Use Planning
	Winter	CET	4302	Geodetic Surveying
		CET	4307	Legal Aspects of Surveying
	Spring	CET	4303	Route Surveying
		CET	4311	Highway Engineering

Computer Technology Programs

The computer technology professional's work relates to the design and use of computer system hardware and software. Areas of study include the design and architecture of the computer system; software issues include the methodology and application of problem solving and the utilization of hardware.

We offer both an associate's and a bachelor's degree program in computer technology.

The associate's degree program in computer technology offers you the opportunity to understand the mathematical and technological foundations of both hardware and software. In addition to providing a more thorough

study of hardware and software, the bachelor's degree program gives you the opportunity to specialize in a specific area through five required technical electives.

Career opportunities may include computer programming for engineering, science, and business. Additional employment opportunities concern designing, engineering, and testing of computers; and interfacing computers with various types of equipment used in automation. Associate's degree graduates may qualify for entry-level positions in the areas listed, while bachelor's degree graduates may secure employment with more responsibility.

Computer Technology (Major Code 036)

The Computer Technology Program leads to the associate in engineering degree. Degree

candidates must earn 99 credits by completing the following four-year curriculum.

First-Year Courses	Fall	GET	4170	Engineering Graphics 1
		MTH	4107	College Algebra
	Winter	GET	4100	Computer Programming for Engineering Technology
		MTH	4108	Pre-Calculus
	Spring	ENG	4110	Critical Writing 1
		MTH	4120	Calculus 1
Second-Year Courses	Fall	MTH	4121	Calculus 2
		PHY	4117	Physics 1
		PHY	4196	Physics Lab 1
	Winter	CT	4150	Computer Organization
		PHY	4118	Physics 2
		PHY	4197	Physics Lab 2
	Spring	GET	4306	Technical Communications
		PHY	4119	Physics 3
		PHY	4198	Physics Lab 3
Third-Year Courses	Fall	EET	4151	Circuit Analysis 1
		MTH	4122	Calculus 3
	Winter	CT	4311	Programming with the C Language
		EET	4152	Circuit Analysis 2
	Spring	EET	4311	Electronics 1
		ENG	4111	Critical Writing 2
Fourth-Year Courses	Fall	CT	4330	Data Structures
		CT	4368	Semiconductor Logic
	Winter	CT	4345	Assembly Language
		CT	4369	Computer Logic
	Spring	CT	4374	Introduction to CPU Hardware
		CT	4381	Operating Systems
		(	)	Social Science/Humanities Elective

Computer Technology (Major Code 037)

The Computer Technology Program leads to the bachelor of science in engineering technology degree. Degree candidates must earn at least 182 credits by completing the following seven-year curriculum.

First-Year Courses	Fall	GET	4170	Engineering Graphics 1
		MTH	4107	College Algebra
	Winter	GET	4100	Computer Programming for Engineering Technology
		MTH	4108	Pre-Calculus
	Spring	ENG	4110	Critical Writing 1
		MTH	4120	Calculus 1
Second-Year Courses	Fall	MTH	4121	Calculus 2
		PHY	4117	Physics 1
		PHY	4196	Physics Lab 1
	Winter	CT	4150	Computer Organization
		PHY	4118	Physics 2
		PHY	4197	Physics Lab 2
	Spring	GET	4306	Technical Communications
		PHY	4119	Physics 3
		PHY	4198	Physics Lab 3
Third-Year Courses	Fall	EET	4151	Circuit Analysis 1
		MTH	4122	Calculus 3
	Winter	CT	4311	Programming with the C Language
		EET	4152	Circuit Analysis 2
	Spring	EET	4311	Electronics 1
		ENG	4111	Critical Writing 2
Fourth-Year Courses	Fall	CT	4330	Data Structures
		CT	4368	Semiconductor Logic
	Winter	CT	4345	Assembly Language
		CT	4369	Computer Logic
	Spring	CT	4374	Introduction to CPU Hardware
		CT	4381	Operating Systems
		(	)	Social Science/Humanities Elective

Fifth-Year Courses	Fall	CT	4335	Numerical Methods
		CT	4375	CPU Architecture
	Winter	CT	4355	Micro Peripheral Hardware
		(	)	Technical Elective
	Spring	CT	4340	Software Engineering Design
		ECN	4115	Economic Principles and Problems 1
		(	)	Social Science/Humanities Elective

Sixth-Year Courses	Fall	CT	4356	Complex Peripheral Hardware
		(	)	Technical Elective
	Winter	CT	4351	Advanced Computer Organization
		(	)	Social Science/Humanities Elective
		(	)	Social Science/Humanities Elective
	Spring	CT	4380	Data Communication Methods
		(	)	Social Science/Humanities Elective
		(	)	Social Science/Humanities Elective

Seventh-Year Courses	Fall	CT	4360	Industry Software
		(	)	Open Elective
		(	)	Technical Elective
	Winter	CT	4365	Industry Hardware
		(	)	Technical Elective
	Spring	(	)	Social Science/Humanities Elective
		(	)	Social Science/Humanities Elective
		(	)	Technical Elective

Suggested Technical Electives	CT	4321	Programming with Ada
	CT	4348	LISP
	CT	4363	Concurrent Programming
	CT	4377	VLSI Design
	CT	4382	Computer Graphics Programming
	CT	4383	Databases
	CT	4384	Large System Assembly Languages
	CT	4387	Bit Slice Microcomputers
	CT	4389	Single-Chip Microprocessors
	CT	4390	Special Problems in Computer Technology
	CT	4393	UNIX Operating System
	CT	4394	Object Oriented Programming
	CT	4395	Computer Security
	CT	4396	PROLOG: An Introduction to Artificial Intelligence
	CT	4397	Advanced UNIX Operating System
	CT	4480	Local Area Networks 1
	CT	4481	Local Area Networks 2

Electrical Engineering Technology Programs

Electrical engineering technologists consider the design and operation of equipment and systems related to communications, data processing, electrical control, and power. In the power utility field, for example, the electrical engineering technologist is responsible for the generation, transmission, and distribution of electricity for light and power.

We offer both an associate's and a bachelor's degree program in electrical engineering technology.

The associate's degree program in electrical engineering technology relates to the design, development, and operation of communications, data processing, and electronic control equipment. The equipment is applied to computers, military and space explorations, and automated industrial production equipment. The bachelor's

degree program, in addition, relates to the installation and production of a variety of electrical and electronic equipment. Fields in which such equipment is applied include communications, data processing, industry, and in generating and utilizing electricity.

Career opportunities for associate's degree graduates include entry-level positions related to communications and electrical equipment, equipment manufacturing, and data processing and control. Career opportunities for bachelor's degree graduates are in public and private research laboratories; engineering consulting firms specializing in industrial and plant applications; electric utilities; and organizations concerned with the operation, manufacture, installation, or sale of electrical or electronic systems and equipment.

Electrical Engineering Technology
(Major Code 033)

The Electrical Engineering Technology Program leads to the associate in engineering degree. The program is accredited by the Technology Accreditation Commission of the Accreditation

Board for Engineering and Technology. Degree candidates must earn at least 104 credits by completing the following four-year curriculum.

First-Year Courses	Fall	GET	4170	Engineering Graphics 1
		MTH	4107	College Algebra
	Winter	GET	4171	Engineering Graphics 2
		MTH	4108	Pre-Calculus
	Spring	GET	4100	Computer Programming for Engineering Technology
		MTH	4120	Calculus 1
Second-Year Courses	Fall	MTH	4121	Calculus 2
		PHY	4117	Physics 1
		PHY	4196	Physics Lab 1
	Winter	ENG	4110	Critical Writing 1
		PHY	4118	Physics 2
		PHY	4197	Physics Lab 2
	Spring	GET	4306	Technical Communications
		PHY	4119	Physics 3
		PHY	4198	Physics Lab 3
Third-Year Courses	Fall	EET	4151	Circuit Analysis 1
		MTH	4122	Calculus 3
	Winter	EET	4124	Circuits Lab 1
		EET	4152	Circuit Analysis 2
		MTH	4123	Differential Equations*
	Spring	EET	4125	Circuits Lab 2
		ENG	4111	Critical Writing 2
		()		Social Science/Humanities Elective
Fourth-Year Courses	Fall	EET	4311	Electronics 1
		EET	4353	Circuit Analysis 3*
		()		Social Science/Humanities Electives
	Winter	EET	4312	Electronics 2
		EET	4354	Circuit Analysis 4*
	Spring	EET	4310	Electrical Measurements
		EET	4313	Electronics 3
		EET	4323	Electronics Lab

*Students not planning to enter a bachelor’s degree program after graduation can substitute a social science/humanities elective for MTH 4123 Differential Equations; EET 4314 Pulse and Digital 1 for EET 4353 Circuit Analysis 3; and an approved technical elective for EET 4354 Circuit Analysis 4.

Electrical Engineering Technology

(Major Code 035)

The Electrical Engineering Technology Program leads to the bachelor of science in engineering technology degree. The program is accredited by the Technology Accreditation Commission of the

Accreditation Board for Engineering and Technology. Degree candidates must earn at least 186 credits by completing the following seven-year curriculum.

First-Year Courses

Fall	GET	4170	Engineering Graphics 1
	MTH	4107	College Algebra
Winter	GET	4171	Engineering Graphics 2
	MTH	4108	Pre-Calculus
Spring	GET	4100	Computer Programming for Engineering Technology
	MTH	4120	Calculus 1

Second-Year Courses

Fall	MTH	4121	Calculus 2
	PHY	4117	Physics 1
	PHY	4196	Physics Lab 1
Winter	ENG	4110	Critical Writing 1
	PHY	4118	Physics 2
	PHY	4197	Physics Lab 2
Spring	GET	4306	Technical Communications
	PHY	4119	Physics 3
	PHY	4198	Physics Lab 3

Third-Year Courses

Fall	EET	4151	Circuit Analysis 1
	MTH	4122	Calculus 3
Winter	EET	4124	Circuits Lab 1
	EET	4152	Circuit Analysis 2
	MTH	4123	Differential Equations
Spring	EET	4125	Circuits Lab 2
	ENG	4111	Critical Writing 2
	(	)	Social Science/Humanities Elective

Fourth-Year Courses

Fall	EET	4311	Electronics 1
	EET	4353	Circuit Analysis 3
	(	)	Social Science/Humanities Elective
Winter	EET	4312	Electronics 2
	EET	4354	Circuit Analysis 4
Spring	EET	4310	Electrical Measurements
	EET	4313	Electronics 3
	EET	4323	Electronics Lab

Fifth-Year Courses

<i>Fall</i>	EET	4314	Pulse and Digital 1
	EET	4327	Advanced Electronics Lab 1*
	SPC	()	Communication Elective
<i>Winter</i>	EET	4328	Advanced Electronics Lab 2*
	EET	()	Technical Elective
	SPC	()	Communication Elective
<i>Spring</i>	EET	4329	Advanced Electronics Lab 3*
	EET	4330	Energy Conversion
	MET	4319	Mechanics

Sixth-Year Courses

<i>Fall</i>	EET	4370	Digital Computers 1
	()		Open Elective [†]
	()		Social Science/Humanities Elective
<i>Winter</i>	EET	4371	Digital Computers 2
	()		Social Science/Humanities Elective
	()		Social Science/Humanities Elective
<i>Spring</i>	EET	4337	Distributed Systems
	EET	()	Technical Elective

Seventh-Year Courses

<i>Fall</i>	EET	()	Technical Elective
	()		Social Science/Humanities Elective
<i>Winter</i>	EET	4377	Control Engineering 1
	EET	()	Technical Elective
	()		Social Science/Humanities Elective
<i>Spring</i>	EET	4378	Control Engineering 2
	()		Social Science/Humanities Elective

Suggested Technical Electives

CT	4311	Programming with the C Language
CT	4374	Introduction to CPU Hardware
CT	4375	CPU Architecture
EET	4315	Pulse and Digital 2
EET	4317	Principles of Communication Systems 1
EET	4318	Principles of Communication Systems 2
EET	4319	Principles of Communication Systems 3
EET	4360	Photovoltaic Technology
EET	4362	Basic Power Systems 1
EET	4363	Basic Power Systems 2
EET	4364	Basic Power Systems 3
EET	4391	Basic Optics and Optical Systems Design
EET	4392	Optoelectronics and Fiber Optics
EET	4393	Applied Wave Optics
IIS	4360	Engineering Economy
IIS	4393	Engineering Probability and Statistics
MET	4340	Thermodynamics A
MET	4380	Materials A

*EET 4341, EET 4342, and EET 4343 Power and Control Labs 1 through 3 may be substituted for EET 4327, EET 4328, and EET 4329 Advanced Electronics Labs 1 through 3.

[†]Open Elective must be a four quarter-hour course.

Manufacturing Engineering Technology Program

Manufacturing systems require interactions between machines and people. Manufacturing engineering technology is concerned with the design and use of manufacturing systems in the industrial environment.

We offer a bachelor's degree program in manufacturing engineering technology.

The bachelor's degree program in manufacturing engineering technology offers you the opportunity to become familiar with the machines, materials, and processes used in manufacturing.

The program emphasizes the emerging use of computers without sacrificing attention to traditional areas of a manufacturing education. Areas addressed in the program include materials and processes, computer-aided manufacturing, numerical control, and robotics. The core courses, combined with hands-on laboratory experiences, allow students to develop the skills required to work in manufacturing. Career opportunities are within various manufacturing industries, such as aircraft or electronics manufacturing.

Manufacturing Engineering Technology (Major Code 056)

The Manufacturing Engineering Technology Program leads to the bachelor of science in engineering technology degree. Degree candidates

must earn 186 credits by completing the following seven-year curriculum.

First-Year Courses	Fall	CHM	4111	General Chemistry 1
		MTH	4107	College Algebra
	Winter	GET	4100	Computer Programming for Engineering Technology
		GET	4170	Engineering Graphics 1
		MTH	4108	Pre-Calculus
	Spring	GET	4171	Engineering Graphics 2
		MTH	4120	Calculus 1
Second-Year Courses	Fall	MTH	4121	Calculus 2
		PHY	4117	Physics 1
		PHY	4196	Physics Lab 1
	Winter	ENG	4110	Critical Writing 1
		PHY	4118	Physics 2
		PHY	4197	Physics Lab 2
	Spring	GET	4306	Technical Communications
		PHY	4119	Physics 3
		PHY	4198	Physics Lab 3
Third-Year Courses	Fall	MFG	4321	Computer-Aided Manufacturing 1
		MTH	4122	Calculus 3
	Winter	IIS	4393	Engineering Probability and Statistics
		MFG	4322	Computer-Aided Manufacturing 2
	Spring	ENG	4111	Critical Writing 2
		MFG	4311	Manufacturing Materials and Processes 1
		(	)	Social Science/Humanities Elective

Fourth-Year Courses

<i>Fall</i>	MFG 4312	Manufacturing Materials and Processes 2
	MFG 4331	Computer Methods in Manufacturing Design 1
	()	Social Science/Humanities Elective
<i>Winter</i>	EET 4320	Electricity and Electronics
	MFG 4332	Computer Methods in Manufacturing Design 2
<i>Spring</i>	ECN 4115	Economic Principles and Problems 1
	()	Social Science/Humanities Elective
	()	Social Science/Humanities Elective

Fifth-Year Courses

<i>Fall</i>	MET 4301	Mechanics A
	MS 4332	Statistical Quality Control
	()	Social Science/Humanities Elective
<i>Winter</i>	IM 4301	Introduction to Operations Management
	MET 4302	Mechanics B
	MFG 4341	Introduction to Computer-Aided Design
<i>Spring</i>	()	Social Science/Humanities Elective
	()	Technical Elective*

Sixth-Year Courses

<i>Fall</i>	IIS 4360	Engineering Economy
	MET 4340	Thermodynamics A
<i>Winter</i>	IM 4314	Productivity Enhancement and Quality
	()	Technical Elective*
<i>Spring</i>	MFG 4351	Assembly Automation
	()	Social Science/Humanities Elective
	()	Technical Elective*

Seventh-Year Courses

<i>Fall</i>	MFG 4361	Numerical Controlled Machines (Basic)
	MFG 4381	Plant Layout and Design
<i>Winter</i>	MFG 4371	Robotics
	()	Technical Elective*
<i>Spring</i>	HRM 4301	Organizational Behavior
	()	Social Science/Humanities Elective
	()	Technical Elective*

*Suggested technical electives are being developed for the manufacturing engineering technology curriculum.

Mechanical Engineering Technology Programs

Mechanical engineering technologists harness power resources that help machinery perform useful tasks. In contrast to civil engineering, which deals primarily with static forces and structures, mechanical engineering is concerned with the motion and kinetics of devices that are activated by hydraulic, electrical, mechanical, and thermodynamic forces.

We offer both an associate's and a bachelor's degree program in mechanical engineering technology. A bachelor's degree program in aerospace maintenance engineering technology is also offered.

The associate's degree offers you the opportunity to prepare to be an entry-level technician in designing, producing, and installing mechanical tools, machinery, engines, and transportation equipment. The bachelor's degree focuses on designing, developing, operating, and installing equipment that involves interactions of mechanical, hydraulic, and thermodynamic forces. The equipment may include machinery, engines, boilers, furnaces, air-conditioning systems, heating systems, and transportation.

Because of the mechanization of all industry, graduates of the associate's degree program in mechanical engineering technology (MET) may find entry-level career opportunities in almost any industry or engineering organization.

The mechanical engineering technology field provides opportunities for people with a broad range of interests, motivations, and abilities. For example, as a graduate working in the materials area you might be involved in specifying materials for a particular application; determining the cause of failures in the field; dealing with corrosion problems and corrosion prevention; and working with the manufacture and production of materials, or their sales and delivery.

Manufacturing attracts many MET graduates. As a tool designer, you might design a fixture for holding parts as they are manufactured. As a manufacturing technologist, you might specify how a complicated part is made, which proce-

dures will come first, and the cost of the operation. You might determine which machines are required to make a certain part. Or, you might program computerized numerical control (CNC) machines or robots, devise efficient material-handling schemes, and plan the flow of materials from raw stock to finished product.

Another area in the field is mechanical design. At a technician level a designer needs basic drafting skills and will typically work on a drafting board or computer graphics terminal. Such people generally have excellent drafting skills. Designers, whether technicians or technologists, also need to understand material properties and manufacturing processes, so that designs use materials effectively and can be manufactured efficiently.

Design analysis, another popular career focus, is the proper sizing and shaping of materials based on their function (that is, the loads they have to carry, the operating environment, and other service conditions). The designer may work on airplanes, ships, engines, oil well drilling or pumping equipment, toys, medical equipment, food processing equipment—the possibilities are endless.

Another career option is plant or building management, which involves heating, ventilation, air conditioning, water, lighting, plumbing, and electrical power requirements. Career opportunities also exist in product or system operation, testing, and technical sales.

The bachelor's degree program in aerospace engineering technology offers preparation for designing, developing, operating, installing, and producing aircraft and aircraft component systems. Career opportunities are available in technical, support, and management positions within the aircraft industry. Additional opportunities may be found within engineering teams that manufacture aircraft or spacecraft components, and among design/application positions in both the civilian and military aerospace markets.

Mechanical Engineering Technology

(Major Code 021)

The Mechanical Engineering Technology Program leads to the associate in engineering degree. The program is accredited by the Technology Accreditation Commission of

the Accreditation Board for Engineering and Technology. Degree candidates must earn 103 credits by completing the following four-year curriculum.

First-Year Courses	Fall	GET	4170	Engineering Graphics 1
		MTH	4107	College Algebra
	Winter	GET	4171	Engineering Graphics 2
		MTH	4108	Pre-Calculus
	Spring	GET	4100	Computer Programming for Engineering Technology
		MTH	4120	Calculus 1
Second-Year Courses	Fall	MTH	4121	Calculus 2
		PHY	4117	Physics 1
		PHY	4196	Physics Lab 1
	Winter	MTH	4122	Calculus 3
		PHY	4118	Physics 2
		PHY	4197	Physics Lab 2
	Spring	ENG	4110	Critical Writing 1
		PHY	4119	Physics 3
		PHY	4198	Physics Lab 3
Third-Year Courses	Fall	CHM	4111	General Chemistry 1
		GET	4364	Kinematics
		MET	4301	Mechanics A
	Winter	GET	4306	Technical Communications
		MET	4302	Mechanics B
	Spring	MET	4314	Stress Analysis A
Fourth-Year Courses	Fall	MET	4380	Materials A
	Fall	ECN	4115	Economic Principles and Problems 1
		MET	4315	Stress Analysis B
		MET	4390	Measurement and Analysis Lab
	Winter	ENG	4111	Critical Writing 2
		MET	4340	Thermodynamics A
		MET	4391	Technology Lab A
	Spring	MET	4370	Fluid Mechanics A
		MET	4392	Technology Lab B
		()		Social Science/Humanities Elective

Mechanical Engineering Technology

(Major Code 023)

The Mechanical Engineering Technology Program leads to the bachelor of science in engineering technology degree. The program is accredited by the Technology Accreditation

Commission of the Accreditation Board for Engineering and Technology. Degree candidates must earn 186 credits by completing the following seven-year curriculum.

First-Year Courses

<i>Fall</i>	GET	4170	Engineering Graphics 1
	MTH	4107	College Algebra
<i>Winter</i>	GET	4171	Engineering Graphics 2
	MTH	4108	Pre-Calculus
<i>Spring</i>	GET	4100	Computer Programming for Engineering Technology
	MTH	4120	Calculus 1

Second-Year Courses

<i>Fall</i>	MTH	4121	Calculus 2
	PHY	4117	Physics 1
	PHY	4196	Physics Lab 1
<i>Winter</i>	MTH	4122	Calculus 3
	PHY	4118	Physics 2
	PHY	4197	Physics Lab 2
<i>Spring</i>	ENG	4110	Critical Writing 1
	PHY	4119	Physics 3
	PHY	4198	Physics Lab 3

Third-Year Courses

<i>Fall</i>	CHM	4111	General Chemistry 1
	GET	4364	Kinematics
	MET	4301	Mechanics A
<i>Winter</i>	GET	4306	Technical Communications
	MET	4302	Mechanics B
<i>Spring</i>	MET	4314	Stress Analysis A
	MET	4380	Materials A

Fourth-Year Courses

<i>Fall</i>	ECN	4115	Economic Principles and Problems 1
	MET	4315	Stress Analysis B
	MET	4390	Measurement and Analysis Lab
<i>Winter</i>	ENG	4111	Critical Writing 2
	MET	4340	Thermodynamics A
	MET	4391	Technology Lab A
<i>Spring</i>	MET	4370	Fluid Mechanics A
	MET	4392	Technology Lab B
	(	)	Social Science/Humanities Elective

Fifth-Year Courses

<i>Fall</i>	IIS	4360	Engineering Economy
	MET	4303	Mechanics C
<i>Winter</i>	MET	4341	Thermodynamics B
	MET	4371	Fluid Mechanics B
<i>Spring</i>	MET	4342	Refrigeration and Air Conditioning
	MET	4416	Stress Analysis C
	OR		
	MET	4481	Materials B

Sixth-Year Courses

<i>Fall</i>	MET	4343	Heat Transfer
	MET	4393	Technology Lab C
	()		Social Science/Humanities Elective
<i>Winter</i>	MET	4330	Mechanical Design A
	MET	4394	Technology Lab D
	()		Social Science/Humanities Elective
<i>Spring</i>	MET	4331	Mechanical Design B
	MET	4395	Technology Lab E
	()		Social Science/Humanities Elective

Seventh-Year Courses

<i>Fall</i>	SPC	()	Communication Elective
	()		Social Science/Humanities Elective
	()		Technical Elective
<i>Winter</i>	EET	4320	Electricity and Electronics
	SPC	()	Communication Elective
	()		Technical Elective
<i>Spring</i>	()		Open Elective*
	()		Social Science/Humanities Elective
	()		Technical Elective

Suggested Technical Electives

CET	4301	Plane Surveying
CET	4331	Steel Design 1
CET	4371	Concrete Design 1
EET	4321	Electricity and Electronics 2
MET	4414	Mechanical Vibrations
MET	4415	Experimental Stress Analysis
MET	4416	Stress Analysis C
MET	4444	Power Generation
MET	4481	Materials B
MET	4482	Applied Metallurgy

*Open Elective must be a four quarter-hour course.

Aerospace Maintenance Engineering
Technology (Major Code 098)

The Aerospace Maintenance Engineering Technology Program leads to the bachelor of science in engineering technology degree. Before entering the program, degree candidates must complete the East Coast Aero Technical School airframe and power plant technical curriculum or its equivalent. In addition, degree candidates

must complete four prerequisite courses. The prerequisite courses are MTH 4107 College Algebra; MTH 4108 Pre-Calculus; MTH 4120 Calculus 1; and CHM 4111 General Chemistry 1. Degree candidates must earn at least 185 credits by completing the following five-year curriculum.

First-Year Courses	Fall	GET 4170	Engineering Graphics 1
		MTH 4121	Calculus 2
	Winter	GET 4171	Engineering Graphics 2
		MTH 4122	Calculus 3
	Spring	GET 4100	Computer Programming for Engineering Technology
		()	Social Science/Humanities Elective
Second-Year Courses	Fall	ENG 4110	Critical Writing 1
		PHY 4117	Physics 1
		PHY 4196	Physics Lab 1
	Winter	ENG 4111	Critical Writing 2
		PHY 4118	Physics 2
		PHY 4197	Physics Lab 2
	Spring	GET 4306	Technical Communications
		PHY 4119	Physics 3
		PHY 4198	Physics Lab 3
Third-Year Courses	Fall	ECN 4115	Economic Principles and Problems 1
		MET 4301	Mechanics A
	Winter	MET 4302	Mechanics B
		MET 4340	Thermodynamics A
	Spring	MET 4314	Stress Analysis A
		MET 4380	Materials A

For the last two years, choose either curriculum A or B.

CURRICULUM A

Fourth-Year Courses	Fall	MET 4315	Stress Analysis B
		MET 4390	Measurement and Analysis Lab
		()	Social Science/Humanities Elective
	Winter	EET 4320	Electricity and Electronics
		MET 4391	Technology Lab A
		()	Social Science/Humanities Elective
	Spring	MET 4370	Fluid Mechanics A
		()	Social Science/Humanities Elective

Fifth-Year Courses	Fall	MET ()	Technical Elective
		()	Social Science/Humanities Elective
	Winter	MET ()	Technical Elective
		()	Open Elective
		()	Social Science/Humanities Elective
	Spring	MET 4481	Materials B
		()	Social Science/Humanities Elective
		()	Social Science/Humanities Elective

CURRICULUM B

Fourth-Year Courses	Fall	MET 4390	Measurement and Analysis Lab
		()	Social Science/Humanities Elective
		()	Social Science/Humanities Elective
	Winter	EET 4320	Electricity and Electronics
		MET 4341	Thermodynamics B
	Spring	MET 4370	Fluid Mechanics A
		()	Social Science/Humanities Elective

Fifth-Year Courses	Fall	MET 4393	Technology Lab C
		MET ()	Technical Elective
		()	Social Science/Humanities Elective
	Winter	MET ()	Technical Elective
		()	Open Elective
		()	Social Science/Humanities Elective
	Spring	MET 4481	Materials B
		()	Social Science/Humanities Elective
		()	Social Science/Humanities Elective

Suggested Technical Electives Same as Mechanical Engineering Technology suggested technical electives (see page 25).

Telecommunications Program

Telecommunications is an interdisciplinary concentration demanding skills and information from several areas of engineering technology. Modern society has experienced an unprecedented growth in information processing and communications, so that individuals who can help design and maintain information and communication systems are in high demand.

We offer an associate's degree program in telecommunications, which offers you the

opportunity to study the electronic transfer of information through voice, data, or video media. Specific methods of electronic transfer, such as electronic signals in wires, light waves in optic fibers, and radio waves in the earth's atmosphere are discussed. There are career opportunities in the telephone, data processing, radio transmission/reception, cable television, service, and computer industries.

Telecommunications (Major Code 038)

The Telecommunications Program leads to the associate in science degree. Degree candidates

must earn 100 credits by completing the following four-year curriculum.

First-Year Courses

<i>Fall</i>	EET	4180	Introduction to Telecommunications
	MTH	4107	College Algebra
<i>Winter</i>	GET	4100	Computer Programming for Engineering Technology
	MTH	4108	Pre-Calculus
<i>Spring</i>	GET	4170	Engineering Graphics 1
	MTH	4120	Calculus 1

Second-Year Courses

<i>Fall</i>	MTH	4121	Calculus 2
	PHY	4117	Physics 1
	PHY	4196	Physics Lab 1
<i>Winter</i>	ENG	4110	Critical Writing 1
	PHY	4118	Physics 2
	PHY	4197	Physics Lab 2
<i>Spring</i>	GET	4306	Technical Communications
	PHY	4119	Physics 3
	PHY	4198	Physics Lab 3

Third-Year Courses

<i>Fall</i>	EET	4151	Circuit Analysis 1
	EET	4384	Video Communications
<i>Winter</i>	ECN	4115	Economic Principles and Problems 1
	EET	4124	Circuits Lab 1
	EET	4152	Circuit Analysis 2
<i>Spring</i>	EET	4125	Circuits Lab 2
	EET	4310	Electrical Measurements
	ENG	4111	Critical Writing 2

Fourth-Year Courses

<i>Fall</i>	EET	4311	Electronics 1
	EET	4381	Telecommunications Systems 1
<i>Winter</i>	EET	4312	Electronics 2
	EET	4382	Telecommunications Systems 2
<i>Spring</i>	EET	4323	Electronics Lab
	EET	4383	Telecommunications Systems 3
	MGT	4101	Introduction to Business and Management 1

Certificate Program Descriptions

Advanced Environmental Science Certificate Program

Intended for upper-level science and engineering students who wish to enter the environmental field, this advanced certificate program is also appropriate as a post-baccalaureate certificate for people working in science or engineering. You

should have a knowledge of calculus, physics, and chemistry. This program is offered through University College. For further information call 617-437-2400.

CET	4350	Environmental Engineering 1
CET	4351	Environmental Engineering 2
ESC	4218	Groundwater
ESC	4219	Geochemistry of Groundwater
ESC	4220	Wetlands
ESC	4221	Environmental Geophysics
MET	4370	Fluid Mechanics A

C/C++/UNIX Specialist

Certificate Program

(Major Code 070)

This certificate enables individuals to improve or increase their knowledge of the latest computer software developments. People wishing to improve their chances of changing or obtaining a job dealing with state-of-the-art topics in the computer field should enroll in this program.

You may be eligible to enter the certificate program if you hold a BS, a BA, or have work experience in the computer industry and knowl-

edge of a higher level language. If you have none of the listed requirements but are interested in learning how to become qualified to enter the program, contact the School of Engineering Technology at 617-437-2500.

A sample program showing how the certificate can be earned in one year of part-time study, taking three courses per quarter, follows.

Fall	CT	4150	Computer Organization
	CT	4311	Programming with the C Language
	ENG	4111	Critical Writing 2
Winter	CT	4330	Data Structures
	CT	4340	Software Engineering
	TCC	4302	Computer Software Technical Writing 2
Spring	CT	4393	UNIX Operating System
	CT	4394	C++ Object-Oriented Programming
	TCC	4303	Seminar in Software Technical Writing

Course Descriptions

Overview

This section contains the following information about each course offered by the School of Engineering Technology.

- **Course number.** Each alpha/numeric course number provides specific information. For example, consider the course number CET 4301.

CET 4301 The alpha code indicates which department is offering the course. In this case, the department is civil engineering technology.

CET 4301 The first number in the numeric code indicates whether the course is offered through the full- or part-time division. All 4000 series courses are offered part-time and most 1000 series courses are offered full-time.

CET 4301 The last three numbers in the code indicate the course level: 001-099 are compensatory courses; 100-299 are introductory- to intermediate-level courses; and 300-699 are advanced-level courses.

- **Course title.**
- **Number of quarter hours (QH).** One quarter hour represents approximately three hours of student learning time (fifty minutes of lecture plus two hours of independent study) per week. If appropriate, class hours (CH) and lab hours (lab) are listed as well.
- **Quarters in which the course is offered.** Not all courses are offered every quarter. If the code TBA is printed next to a course title, call the program coordinator at 617-437-2500 for scheduling information.
- **Topics discussed in the course.**
- **Prerequisites.** Complete prerequisites before enrolling, unless otherwise specified.

Use the curriculum listed for your program to determine which courses you need to complete

in the next academic year ("Degree Program Descriptions," see page 5). Use the course descriptions to read about each specific course and to learn the quarters in which the course is offered. Because most courses are not offered every quarter, plan your course load for the entire academic year, not just the next quarter.

Before registration, get the *University College and School of Engineering Technology Schedule* for the next quarter by calling 617-437-2500. The *Schedule* provides you with the meeting times and locations for the courses being offered during the next quarter.

Academic counseling is available to help plan your course load for the coming academic year. In addition, you can get a current *Tentative Part-Time Schedule*. If you need help, contact a School of Engineering Technology program counselor at 617-437-2500.

Policy on Changes of Program

The School of Engineering Technology reserves the right to cancel, modify, or add to the courses in any curriculum. The University further reserves the right to change the requirements for graduation. Any changes that may be made from time to time relative to this policy shall be applicable to all students in the school, college, or department concerned, including former students who may re-enroll.

Guidelines for Choosing Electives

Many of the degree program curricula require students to complete electives. The electives give students the opportunity either to explore topics beyond the curriculum's scope or to gain extensive knowledge about topics introduced by the core courses.

Open Electives

Any course is acceptable as an open elective except physical education, military science, and preparatory courses. An open elective may be either a three or a four quarter-hour course depending on your major.

Social Science/Humanities Electives

Social science/humanities electives are offered through University College and must be chosen from a list that is available from the School of Engineering Technology. Six quarter-hours of social science/humanities electives must be in the speech communications (SPC) category.

Technical Electives

Technical electives must be chosen from the list of suggested technical electives appearing at the end of the respective degree curriculum. Students wishing to take an upper-level course that does not appear on the list must petition for permission before attending the class. Students should submit a proposed program of elective courses—preferably representing a minor field of concentration consistent with personal career objectives—for approval by the program coordinator.

Preprofessional Medical Courses

The following information is provided for students who plan to apply for admission to schools of medicine, osteopathy, dentistry, podiatry, or optometry. Those who wish to pursue veterinary medicine may need to meet different entrance requirements and should consult the chair of the Health Professions Advisory Committee for additional advice at 617-437-2818.

Medical School Admission Requirements

Students must complete the following courses before they may enroll in medical school, and should complete them before taking the school's particular admission test (MCAT, DAT, and so on). MCAT exam applications are available from the Office of Career Development, 120 Ryder Hall, 617-437-2430.

- Biology: one year (with labs)
- General chemistry: one year (with labs)
- Organic chemistry: one year (with labs)
- Physics: one year (with labs)
- College mathematics: one year (with some calculus)
- College English: one year

Northeastern University's Health Professions Advisory Committee provides academic advice and help with professional school applications to students in any of the University's health programs. Although advice is available to anyone

enrolled in a course, the committee can prepare evaluation letters only for those who have letters of recommendation from at least two Northeastern faculty members.

Sources of Advice**General Counseling, Application Procedures and Entrance Exams**

C. H. Ellis, Jr., Chair
Health Professions Advisory Committee
Department of Biology
College of Arts and Sciences
445 Richards Hall
Northeastern University
Boston, Massachusetts 02115
617-437-4032

Course Schedules and Counseling

Paula Vosburgh, Assistant Dean and Director
Health Professions and Sciences Programs
University College
266 Ryder Hall
Northeastern University
Boston, Massachusetts 02115
617-437-2818

Physics and Mathematics Courses

Dean Thomas E. Hulbert, Director
School of Engineering Technology
120 Snell Engineering Center
Northeastern University
Boston, Massachusetts 02115
617-437-2500

Course Sequences to Meet Minimum Admission Requirements

Acceptable course sequences can be taken at University College to prepare students for health profession schools. Completing one sequence from each category should meet the minimum requirements of most medical or dental schools. If you have questions about whether other courses might be applicable, contact Dean Vosburgh or Professor Ellis. You should contact medical or dental school(s) directly to obtain guidance on specific courses required for admission.

General Biology: BIO 4103, BIO 4104, BIO 4105. Lab required. Other biology courses—such as anatomy, physiology, and microbiology—may be acceptable, depending on the professional school. General biology is highly recommended even if you have already taken the other courses.

General Chemistry: CHM 4111, CHM 4112, CHM 4113. Lab required.

Organic Chemistry: CHM 4261, CHM 4262, CHM 4263. Lab required.

General Physics: PHY 4117, PHY 4118, PHY 4119, and labs PHY 4196, PHY 4197, PHY 4198.*

Mathematics: MTH 4108, MTH 4120, MTH 4121.

English: ENG 4110, ENG 4111, ENG 4112.

Requirements in two additional areas, if needed—behavioral science and biochemistry—can be met by the following courses.

Behavioral Science: PSY 4110, PSY 4111, PSY 4112, and/or other psychology courses.

Biochemistry: CHM 4371, CHM 4372, CHM 4373 or BIO 4246, BIO 4247, BIO 4248.

Chemistry

CHM 4111 General Chemistry 1[†]

(2 CH, 2.4 lab, 3 QH) Fall

Presents fundamental chemistry concepts such as symbols, formulas, equations, atomic weights, and calculations based on equations. Includes gases, liquids, solutions, and ionization. *The required lab is CHM 4117. Lab fee. Prereq. MTH 4107 or equiv.*

Civil Engineering Technology

CET 4301 Plane Surveying

(4 QH) Fall

Examines surveying principles; theory of measurements; leveling; traverse computations; area calculation; and stadia principles and topography. *Prereq. MTH 4108.*

CET 4302 Geodetic Surveying

(4 QH) Winter

Introduces practical astronomy for surveying, including basic spherical trigonometry. Covers geodetic surveying, including precise leveling, triangulation, EDM equipment, and baseline measurements. *Prereq. CET 4301.*

*Some medical schools have allowed PHY 4101 and PHY 4102 College Physics 1 and 2 to be used for admission. Before choosing this sequence, contact the school you wish to apply to for their preference for a physics course sequence.

[†]This is a University College course offered at a different tuition rate.

CET 4303 Route Surveying

(4 QH) Spring

Studies simple and compound curves; vertical curves; earthwork computations; solution of the mass diagram; and an introduction to route location by photogrammetry. *Prereq. CET 4301.*

CET 4307 Legal Aspects of Surveying

(4 QH) Winter

Covers registry of deeds and probate; ownership of land; deeds; descriptions of qualifying expression; adverse possession; Massachusetts land court; and expert witness. *Prereq. CET 4301.*

CET 4311 Highway Engineering

(4 QH) Spring 1993

Explores engineering considerations in the planning and construction of modern highways and highway routing; traffic flow and traffic control; and computer applications to transportation problems. *Prereq. CET 4301.*

CET 4316 Land Use Planning

(4 QH) Fall 1993

Studies environmental, sociological, economic aspects, and traditional basis for land use planning. Covers objectives, content, form, and preparation of plan; community and public facilities; transportation; and environmental impact and plan implementation. *Prereq. GET 4171.*

CET 4321 Introduction to Structural Design

(2 CH, 4 lab, 4 QH) Spring

Presents tabular methods for the design of members and connections using the AISC Code. *Prereq. GET 4171 and MET 4314.*

CET 4324 Structural Analysis 1

(4 QH) Fall

Surveys the reactions, shears, bending moments, and forces developed by loading systems on beams and trusses; influence lines for beams, girders, and trusses; and solutions for forces from moving load systems on statically determinate structures. *Prereq. MET 4315.*

CET 4325 Structural Analysis 2

(4 QH) Winter

Covers classical methods of deflection solution for beams and trusses. Discusses methods of solving statically indeterminate structures. *Prereq. CET 4324.*

CET 4331 Steel Design 1

(4 QH) Fall 1992, 1994

Examines design of steel members in structural frames, tension, compression, bending and eccentrically loaded members; and design of plate girders for buildings. *Prereq. CET 4321 and MET 4315.*

CET 4332 Steel Design 2**(4 QH) Winter 1993**

Presents design of steel for highway bridges, composite design in bridges and buildings, introduction to plastic analysis, and design in steel.

Prereq. CET 4331.

CET 4341 Fluid Mechanics**(4 QH)**

This course has been replaced by MET 4370 Fluid Mechanics A.

CET 4350 Environmental 1**(4 QH) Winter**

Examines principles of water supply engineering; population forecasting; and quality and quantity of water for various uses. Other topics include water treatment processes; collection and disposal of wastewater and storm water; modern treatment methods; and wastewater plant operation.

Prereq. CET 4341 and CHM 4111.

CET 4351 Environmental 2**(4 QH) Spring**

Studies the layout and design of water treatment and sewage treatment plants; and instrumentation and electrical equipment. Includes laboratory demonstrations. *Prereq. CET 4350.*

CET 4361 Materials and Soil Mechanics**(4 QH) Fall 1992, 1994**

Examines the physical properties of portland cement, aggregates, mixing water and admixtures; batch proportioning; bituminous materials; index properties of soils, soil moisture and structure; compressibility; and theory of consolidation.

Prereq. MET 4315.

CET 4371 Concrete Design 1**(4 QH) Winter 1993**

Examines the design of bending members, axially and eccentrically loaded columns by elastic and ultimate strength principles. *Prereq. MET 4315.*

CET 4372 Concrete Design 2**(4 QH) Spring 1993**

Covers the reinforced concrete design of basic structures, including considerations of continuity. Includes an introduction to prestressed concrete member design. *Prereq. CET 4371.*

CET 4393 Construction Administration**(4 QH) Spring 1994**

Discusses contracts, specifications, and bidding procedures; estimating and scheduling, including critical path; and discussion of personnel administration and union negotiation. Includes bid preparation for a small project. *Prereq. None.*

CET 4399 Special Problems in Civil Engineering Technology**(4 QH) TBA**

Engages students in theoretical or experimental work under individual faculty supervision. *Prereq. Permission of department chair.*

Computer Technology

CT 4105 Pascal/Algorithms**(4 QH)**

This course is replaced by GET 4100 Computer Programming for Engineering Technology.

CT 4150 Computer Organization**(4 QH) Winter**

Presents basic computer architecture. Topics include number systems' operation and conversion, logic circuits, registers, data busses, ROM/RAM, microcomputer structure and operation, microprocessor internal components, microprocessor programming, and input/output processing.

Prereq. GET 4100.

CT 4311 Programming with the C Language**(4 QH) Fall, Winter, Summer**

Teaches C, a general purpose language suitable for programming operating systems, text-processing, and databases. Covers functions, arrays, character strings, global and local variables, scope rules, pointers, address arithmetic, structures, unions, and singular linked lists. A project is required.

Prereq. GET 4100.

CT 4321 Programming with Ada**(4 QH) TBA**

Teaches Ada, a programming language for numerical applications, system programming applications, and applications with real-time and concurrent execution requirements. Includes readability, strong typing, exception handling, data abstracting, tasking, and generic units. Involves using the University's computer facilities to write programs dealing with numerical and system programming applications. *Prereq. CT 4311, or knowledge of Pascal or FORTRAN.*

CT 4330 Data Structures**(4 QH) Winter**

Introduces methods of representing and manipulating data in computer memory. Covers stacks, queues, lists, trees, heaps, sets, graphs, hashing, searching, and sorting. Project required.

Prereq. CT 4311.

CT 4335 Numerical Methods**(4 QH) Spring**

Presents computer methods for solving mathematical problems. Involves writing and running application programs using the University's computer facilities. Covers deterministic versus stochastic methods, random number generators, iterative versus noniterative solutions, maxima and minima in two and three variables, curve fitting in two and three variables, integrals, trapezoidal and Simpson's rules, slopes, difference equations in two and three variables, vector and matrix algebra, simultaneous linear equations, nonlinear equations, permutations, and combinations. *Prereq. CT 4311 and MTH 4122.*

**CT 4340 Software Engineering Design
(4 QH) Winter**

Offers structured methods for developing complex computer software. Explores developing structured specifications, structured designs, and the computer programs for complex problems using the University's computers. Topics include partitioning, hierarchical organization, data flow diagrams, data dictionaries, structured English, decision trees, decision tables, structured charts, team design, structured programs, and maintainability.

Prereq. CT 4330.

**CT 4345 Assembly Language
(4 QH) Winter**

Teaches typical microprocessor assembly language. Involves writing and running programs on a 68000 microprocessor-based system. Covers CPU architecture, instruction sets, addressing modes, binary operation, code conversion, subroutines, macros, and input/output. *Prereq.* CT 4311 and CT 4150.

**CT 4348 LISP
(4 QH) TBA**

Introduces an interactive language in which the LISP interpreter is commonly referred to as the read-evaluate-print loop. Discusses various levels of implementation in LISP, a language well-suited to implement the standard techniques of data structure manipulation. Also explores techniques for recursion, complex data structures, storage management, and symbol table manipulation.

Prereq. CT 4330.

**CT 4351 Advanced Computer Organization
(4 QH) Winter**

Examines the functional characteristics of complex and special purpose computer systems, and the functions of general purpose multi-user and multi-processing operating systems. Advanced topics include virtual memory and virtual machine architectures, distributed and multiprocessor systems, array processors, and system performance analysis.

Prereq. CT 4356 and CT 4375.

**CT 4355 Micro Peripheral Hardware
(4 QH) Spring**

Covers the elements of microprocessor peripheral hardware and its interfacing. Involves designing and analyzing microprocessor systems, including detailed schematics, timing diagrams, and technical documentation. Topics include serial input/output devices, DMA and interrupt control devices, standard busses, bus arbitration techniques, and bus support VLSI. *Prereq.* CT 4374.

**CT 4356 Complex Peripheral Hardware
(4 QH) Fall**

Studies the interfacing and implementation of complex peripheral systems. Topics include disk and tape interfaces; graphic display devices; communication interfaces and subsystems; and input/output processors. *Prereq.* CT 4355.

**CT 4360 Industry Software
(4 QH) Fall**

Surveys current commercial software packages and methods. Involves the exercise of commercial packages implemented on the University's computer facilities where applicable. Topics include specific current packages and methods drawn from the categories of: database management, scientific and statistical analysis, security and privacy, software assurance, and documentation. *Prereq.* CT 4381.

**CT 4363 Concurrent Programming
(4 QH) TBA**

Examines the basic principles of concurrent programming. Students will write and run programs to demonstrate various aspects of concurrent programming techniques and issues. Topics include correctness of concurrent programs, material exclusion, timing Dekker's algorithms, the producer-consumer problem, monitors, semaphores, "Ada Rendezvous," critical regions, and conditional variables. *Prereq.* CT 4311.

**CT 4365 Industry Hardware
(4 QH) Winter**

Discusses the latest industrial developments and trends in computer hardware, conducted as a seminar. *Prereq.* CT 4356.

**CT 4368 Semiconductor Logic
(4 QH) Fall**

Analyzes the bipolar and MOS transistors in saturated and cutoff conditions. Examines implementing these concepts to form basic logic circuits and standard logic families, and convert logical expressions into hardware configuration representations. Topics include Ebers-Moll modeling, PMOS, NMOS, CMOS, bipolar characteristics, and standard logic families. *Prereq.* EET 4311.

**CT 4369 Computer Logic
(4 QH) Winter**

Introduces the hardware building blocks of digital computers. Teaches students to specify configurations of gates and memory components to achieve combinational and sequential composite logical functions, and perform finite state machine design and analysis. Topics include gates, flip-flops, registers, decoders, ALUs, memory arrays, and synchronous and asynchronous state machines.

Prereq. CT 4368.

**CT 4374 Introduction to CPU Hardware
(4 QH) Spring**

Introduces the circuits and operation of microcomputers, focusing on microprocessor components and circuits, including detailed timing and functional analysis of their interactions. Topics include central processing unit, memory, addressing, clocking, bus concepts, interrupts, coprocessors, input/output, and instruction timing.

Prereq. CT 4345 and CT 4369.

CT 4375 CPU Architecture**(4 QH) Fall**

Presents high performance microprocessor architecture and hardware interfacing techniques. Analyzes current commercial processors and their support components. Topics include internal CPU architecture, memory management, instruction prefetch, privilege states, bus cycles, control lines, input/output, interrupts, exceptions, and pipelining.

Prereq. CT 4374.

CT 4377 VLSI Design**(4 QH) TBA**

Introduces Very Large Scale Integration (VLSI) Integrated Circuits (ICs), the key components of all modern computers. Examines MOS devices, circuits, design methods, and fabrication techniques used in producing custom VLSI ICs. Topics include MOS transistor characteristics; basic gate circuits; scaling; layout tools, both manual and automated; wafer fabrication techniques; standards; testing; and costs. *Prereq.* CT 4369.

CT 4379 Computer Networks**(4 QH)**

This course has been replaced by CT 4480 Local Area Networks 1.

CT 4380 Data Communication Methods**(4 QH) Spring**

Discusses the ISO Open Systems Interconnect model for communication systems, including the functional and operational aspects of data communication devices and software. Uses a black box approach. Topics include modems, control units, multiplexers, concentrators, front-end processors, and error checking. *Prereq.* CT 4375.

CT 4381 Operating Systems**(4 QH) Spring**

Introduces the basic principles and organization of operating system implementation. Topics include processor management, process multiplexing and synchronization, schedules, atomic operations and mutual exclusion, sequential and concurrent programming, memory, and device and data management. *Prereq.* CT 4330 and CT 4345.

CT 4382 Computer Graphics Programming**(4 QH) TBA**

Explores the computer plotting of two- and three-dimensional (2D and 3D) shapes. Involves writing and running programs using the University's computer and digital plotter. Topics include 2D transforms, 3D to 2D transforms, 3D transforms, surface representation, shading, hidden line, raster technology-color, introduction to interactive graphics, characters, curve fitting, and graphic data structures. *Prereq.* GET 4100 and GET 4170.

CT 4383 Databases**(4 QH) TBA**

Examines database organization structure and management. Involves writing and running programs exemplifying techniques developed in class, using the University's computer facilities. Topics include access methods, attributes, indices, keys, querying, searching and matching, file sets, inverted file sets, normal forms, and random access. *Prereq.* CT 4330.

CT 4384 Large System Assembly Languages**(4 QH) TBA**

Explores Macro, a VAX-11 assembly language, to show how basic components in the CPU are used during program execution. Topics include integer, real, and character instruction sets, various addressing techniques, procedure linkage, and system input/output. *Prereq.* CT 4345.

CT 4387 Bit Slice Microcomputers**(4 QH) TBA**

The epitome of hardware flexibility is represented by the bit slice CPU. Students examine the basic design ground rules common to this style of hardware design. *Prereq.* CT 4355.

CT 4389 Single-Chip Microprocessors**(4 QH) TBA**

When small 8-bit intelligent devices are rewired in high volume, the single-chip microprocessor in the form of the 3870, 8048, Z8, and others comes into play. An understanding of the hardware limitations of a single-chip system is the basis for this subject material. *Prereq.* CT 4375.

CT 4390 Special Problems in Computer Technology**(4 QH) TBA**

Students perform theoretical or experimental work under individual faculty supervision. *Prereq.*

Permission of department chair.

CT 4391 Topics in Computer Technology**(4 QH) TBA**

Focuses on advanced topics in Computer Technology to be selected by the instructor. *Prereq.* *Permission of the instructor.*

CT 4393 UNIX Operating System**(4 QH) TBA**

Surveys advanced topics in the UNIX operating system and its filing system, including differences between the AT&T and Berkeley versions of UNIX. Also covers pipes, forks, execl, filter, signals, concurrency, processes, semaphores, EMACS, C preprocessor, macros, sed, grep, awd, make, gdb, dbx, lint, cb, lex, yacc, TeX, and shell programming.

Prereq. CT 4311.

**CT 4394 Object-Oriented Programming
(4 QH) TBA**

Examines the methodologies currently used in object-oriented programming languages, drawing on case studies of Small Talk, Flavors, CLOS, and C⁺⁺. Other topics include G-Base, an object-oriented database system, and the concepts of abstraction, polymorphism, class inheritance, locks, and generic dispatch. *Prereq.* CT 4330.

**CT 4395 Computer Security
(4 QH) TBA**

Covers issues related to security in computing, including the history of security, encryption techniques and applications, secure communications, and software protection. Other topics include software verification and validation, designing security into the hardware, and products currently available for securing systems and data. These subjects will be addressed in terms of privacy as well as reliability. *Prereq.* CT 4380 and CT 4381.

CT 4396 PROLOG: An Introduction to Artificial Intelligence (4 QH) TBA

Introduces fundamental artificial intelligence (AI) terms and techniques, using PROLOG as a programming language. Topics include knowledge representation, search, parsing, logic, and inference techniques. Projects required. *Prereq.* CT 4330.

**CT 4397 Advanced UNIX Operating System
(4 QH) TBA**

Studies design and development of C application programs that interface with the UNIX operating system kernel. Enables C programmers to access UNIX system functions through system calls and library routines. Topics include fundamental concepts, file creation and access, signals and interrupt handling, multitasking, file and terminal I/O, processes, and various forms of interprocess communication (IPC) and synchronization. The University's computer facilities are used to run programming assignments. (UNIX is a registered trademark of AT&T Bell Laboratories.) *Prereq.* CT 4393.

**CT 4480 Local Area Networks 1
(4 QH) TBA**

Introduces Local Area Network concepts, architectures, application, protocols, and components. Focuses on the first three layers of the ISO reference model: physical, data link, and network layers. Examines Ethernet, SNA, Token Bus, Token Ring, and other IEEE standards. (Not open to students who have taken CT 4379.) *Prereq.* CT 4380.

**CT 4481 Local Area Networks 2
(4 QH) TBA**

Examines the upper four layers of the ISO reference model: transport, session, presentation, and application layers. Topics include TCP/IP, DECNET,

NETBIOS, FTP, TELNET, and E-MAIL.

Prereq. CT 4480 or permission of the instructor.

**CT 4492 Independent Study in Computer Technology
(4 QH) TBA**

Independent study of advanced computer technology projects for students—usually in their junior or senior year—who have high scholastic standing. Projects may be of an applied or theoretical nature resulting in a formal report submitted to the project supervisor at the end of the quarter. *Prereq.* Permission of adviser and project supervisor.

**CT 4493 Independent Study in Computer Technology
(4 QH) TBA**

Independent study of advanced computer technology projects for students—usually in their junior or senior year—who have high scholastic standing. Projects may be of an applied or theoretical nature resulting in a formal report submitted to the project supervisor at the end of the quarter. *Prereq.* Permission of adviser and project supervisor.

Earth Sciences

**ESC 4218 Groundwater*
(3 QH) TBA**

Discusses the geologic nature of different types of aquifers in New England and other parts of the world. Examines the principles of groundwater flow in permeable rock and soil. (This course is valid only as an open elective for School of Engineering Technology students.) *Prereq.* Calculus course or permission of the instructor.

**ESC 4219 Geochemistry of Groundwater*
(3 QH) TBA**

Describes how the composition of uncontaminated groundwater is affected by the chemistry of precipitation and by reactions with the organic and inorganic components of soil and rock. Considers the geochemical aspects of a number of specific groundwater contamination problems, including leachate plumes from landfills, improper disposal of hazardous wastes, leaking underground storage tanks, saltwater intrusion of coastal aquifers, and so on. (This course is valid only as an open elective for School of Engineering Technology students). *Prereq.* Students should have taken at least one chemistry course.

**ESC 4220 Wetlands*
(3 QH) TBA**

Explores the hydrology and biogeochemistry of wetlands, describes the attributes of specific wetland types, and examines current wetland protection and management strategies. (This course is valid only as an open elective for School of Engineering Technology students). *Prereq.* None.

*This is a University College course offered at a different tuition rate.

ESC 4221 Environmental Geophysics***(3 QH) TBA**

Intended for both students and practicing professionals. Shows how geophysical techniques can help solve a wide range of environmental and engineering problems. After a brief historical survey, the most commonly used methods are considered in detail, including seismic, gravity, magnetics, resistivity, electromagnetics, ground penetrating radar, and borehole methods. Emphasizes practical applications, using numerous case studies as examples. Provides an opportunity to design and plan geophysical studies based on actual and theoretical situations. (This course is valid only as an open elective for School of Engineering Technology students.)

Prereq. None.

Economics

ECN 4115 Economic Principles and Problems 1* (3 QH) All Quarters

Applies the basic principles of economics to current public problems. Focusing on macroeconomics, explores the issues of unemployment, inflation, national income and employment theory, and government expenditures and taxation. *Prereq. None.*

ECN 4116 Economic Principles and Problems 2* (3 QH) All Quarters

Continues ECN 4115, focusing on the role of the banking system, the Federal Reserve System, and supply-side policies. Topics in microeconomics include the role of a market pricing system, supply and demand, the costs of production, profits, and the supply decision. *Prereq. ECN 4115 or equiv.*

Electrical Engineering Technology

EET 4124 Circuits Laboratory 1**(3 lab, 2 QH) Fall, Winter**

Involves experiments in DC electrical circuits and the study of various measurement techniques. Includes use of ammeters, ohmmeters, voltmeters, VOMs, and power supplies. Studies equivalent resistance, series and parallel circuits, Ohm's Law, Thevenin and Norton Theorems, as well as superposition and maximum power transfer theorems. *Prereq. EET 4151.*

EET 4125 Circuits Laboratory 2**(3 lab, 2 QH) Winter, Spring**

Offers further experimentation in electrical circuits and measurement techniques. Involves the operation of oscilloscopes, audio frequency and function generators. Explores inductance, capacitance, and the effect of frequency upon them.

Studies measurements of amplitude, frequency, and phase shift using a variety of series/parallel RL, RC, and RLC circuitry. Examines circuit time constants and their relation to repetition rate, along with resonance, circuit quality, and filter circuits.

*Prereq. EET 4124.***EET 4151 Circuit Analysis 1****(4 QH) Fall, Spring, Summer**

Introduces Ohm's law, Kirchoff's current and voltage laws, equivalent resistances, independent and dependent sources, mesh and nodal analysis, and power relations, all concentrating on direct current circuits. Other topics include Thevenin and Norton theorems, the operational amplifier, and energy storage elements such as the capacitor and inductor. *Prereq. MTH 4120 or PHY 4119.*

EET 4152 Circuit Analysis 2**(4 QH) Fall, Winter, Summer**

Studies the time domain (transient) analysis of R, L, and C elements; the energy storage in L and C circuits; and the responses in source-free RL and RC circuits. Includes the application of the unit step function and the response of RLC circuits. Introduces frequency domain methods to solve sinusoidal steady-state circuits using complex frequency concepts and phasor algebra. Also covers three-phase circuits and three-wire single-phase systems. *Prereq. EET 4151.*

EET 4180 Introduction to Telecommunications**(4 QH) Fall**

Introduces students to voice, video, and data communications. Surveys the development of telephony and the operation of the telephone network. Emphasizes current developments in communications, particularly the use of digital transmission and switching. Introduces terminology peculiar to telephony. (Not open to electrical engineering technology majors.) *Prereq. None.*

EET 4310 Electrical Measurements**(4 QH) Spring**

Examines standards of measurements, dimensional analysis, errors and measurements of dispersed data, discrete and continuous variables, binomial distribution, and normal distribution. Other areas include guaranteed error, methods of resistance measurements, digital voltmeters and analog to digital conversion, voltage references, potentiometers, and AC bridges. *Prereq. EET 4152.*

EET 4311 Electronics 1**(4 QH) Fall, Spring, Summer**

Introduces digital electronics starting with the binary number system and proceeding to logic gates, boolean algebra, combinatorial logic circuits, and the basic arithmetic units used in digital computers such as adders, counters, and shift registers. *Prereq. EET 4152.*

*This is a University College course offered at a different tuition rate.

EET 4312 Electronics 2**(4 QH) Fall, Winter, Summer**

Introduces analog electronics starting with the basic semiconductor materials and proceeding to the derivation of both the large and small signal models for diodes, bipolar junction transistors (BJTs), junction field effect transistors (JFETs), and metal oxide silicon field effect transistors (MOSFETs). Practical circuits using these devices are also discussed. *Prereq. EET 4311.*

EET 4313 Electronics 3**(4 QH) Fall, Spring**

Continues the analog electronics of EET 4312 and covers transistor voltage amplifiers, transistor power amplifiers, operational amplifiers, power supplies, oscillators, and a selection of specialized semiconductor devices such as Schottky diodes, uni-junction transistors, and silicon controlled rectifiers (SCRs). *Prereq. EET 4312.*

EET 4314 Pulse and Digital 1**(4 QH) Fall**

Develops the physical devices and the physical waveforms of digital circuits, as a complement to the mathematical and idealized development of EET 4311. Discusses practical pulse waveforms and how they can be shaped by linear circuits. Examines the effects of diodes, transistors, field-effect devices, and operational amplifiers upon these waveforms. Discusses waveform generators such as unijunction transistors, the 555 timer, and Schmitt trigger circuits. Reviews the currently available logic families such as TTL, Tri-State, MOS, and CMOS. *Prereq. EET 4313.*

EET 4315 Pulse and Digital 2**(4 QH) Winter**

Discusses the extension of combinatorial logic to arithmetic units, coders, decoders, and code converters, multiplexers, and programmable logic units. Includes a detailed development of SR, D, and JK flip-flops and their application to sequential logic circuits such as counters, shift registers, and high-speed memory. Emphasizes applications to instrumentation rather than to digital computers. *Prereq. EET 4314.*

EET 4317 Principles of Communication Systems 1**(4 QH) Fall 1993**

Introduces signal analysis using Fourier methods; noise in communication systems; frequency selective amplifiers, including wideband; transistor power amplifiers AF and RF; oscillators; signal sources; and applications. *Prereq. EET 4313.*

EET 4318 Principles of Communication Systems 2
(4 QH) Winter 1994

Explores the basic theory of amplitude, frequency, phase, and pulse code modulated systems; analysis of modulating and demodulating circuits; carrier systems using SSB; system block and level diagrams; logic control circuits in communication systems; and modems. *Prereq. EET 4317.*

EET 4319 Principles of Communication Systems 3**(4 QH) Spring 1994**

Presents the fundamentals of digital communications; sampling requirements; analog-to-digital conversion methods; system capacity and bandwidth; comparison of practical digital systems PAM, PCM, PFM, and PWM; time and frequency division multiplexing; data decoding; and selected examples from telemetry and computer links. *Prereq. EET 4318.*

EET 4320 Electricity and Electronics**(4 QH) Winter**

Introduces students to circuit analysis, resistive networks, periodic excitation functions, steady state AC circuits; study of the physical foundations of electronics and the physical operation of electronic devices. (Not open to electrical engineering technology majors.) *Prereq. MTH 4120 and PHY 4119.*

EET 4323 Electronics Laboratory**(3 lab, 2 QH) Spring**

Offers experimentation with nonlinear semiconductors. Explores junction and zener diodes. Studies typical applications in clippers, clampers, rectification, filtering, electronic power supplies, voltage regulation, and integrated circuit regulators. Discusses bipolar and field effect transistors, amplifiers and voltage follower configurations, special semiconductors and operational amplifiers. *Prereq. EET 4311.*

EET 4327 Advanced Electronics Laboratory 1**(3 lab, 2 QH) Fall**

Includes experiments using oscilloscopes and examines transistor audio amplifiers, push-pull amplifiers, drivers, pulse and video amplifiers, transients and wave-shaping circuits, audio frequency oscillators, and operational amplifiers. *Prereq. EET 4323.*

EET 4328 Advanced Electronics Laboratory 2**(3 lab, 2 QH) Winter**

Experiments with the modulation of a class C amplifier, the diode detector, basic timing circuits, RF and crystal oscillators, astable multivibrators, logic gates, flip-flops, binary adders, registers, and counters. Considers active filters, frequency modulation detectors, and analog-to-digital and digital-to-analog conversion. *Prereq. EET 4327.*

EET 4329 Advanced Electronics Laboratory 3**(3 lab, 2 QH) Spring**

Involves spectral studies of FM and PM waves; amplitude limiters; the balanced modulators and single sideband generators; integrated circuit timers and monolithic random access memory; and monolithic phase-locked loop. Offers microwave experiments and a series of digital experiments. *Prereq. EET 4328.*

EET 4330 Energy Conversion**(4 QH) Spring**

Explores the generalized theory of rotating energy conversion devices; steady-state operation of the

multiply-excited direct-current machine; control of speed; special machines; transformers; steady-state considerations of induction and synchronous machines; generalized machine and circuit model; and Laplace transform techniques applied to the analysis of dynamic operating modes of rotating machines. *Prereq.* EET 4353.

EET 4337 Distributed Systems
(4 QH) Spring

Examines radiation, transmission, and reception of electromagnetic waves; distributed-line constants and traveling waves of transmission lines; and differential equations of the uniform line.

Prereq. MTH 4122 and PHY 4119.

EET 4341 Power and Controls Laboratory 1
(3 lab, 2 QH) Fall 1992

Introduces standard laboratory measurement equipment, including voltmeters, ammeters, oscilloscopes, and frequency counters, as well as data-taking methods and report writing. Investigates diodes, bipolar transistors, field effect devices, silicon control rectifiers, unijunction transistors, power supplies, regulators, and various types of feedback transistor amplifiers.

Prereq. EET 4330.

EET 4342 Power and Controls Laboratory 2
(3 lab, 2 QH) Winter 1993

Offers experiments with characteristics of DC motors and generators, single- and multi-phase transformers, induction motors, synchronous motors, and three-phase power measurements.

Prereq. EET 4341.

EET 4343 Power and Controls Laboratory 3
(3 lab, 2 QH) Spring 1993

Offers experiments with self-synchronous devices such as control transformers, transmitters and receivers, AC and DC servomotors, and open and closed loop response of servomechanisms and stepping motors. *Prereq.* EET 4342.

EET 4353 Circuit Analysis 3
(4 QH) Fall, Spring

Examines the application of differential equations to the solutions of linear, time-invariant electrical networks. Introduces singularity functions, convolution, and time domain transient analysis; network topology and duality; and the methods of transformation calculus and complex frequency concepts.

Prereq. EET 4152.

EET 4354 Circuit Analysis 4
(4 QH) Fall, Winter, Summer

Covers signal analysis in the frequency domain; Fourier series; and Fourier and Laplace transform methods. Requires solving circuit problems using Laplace transforms and related theorems.

Prereq. EET 4353.

EET 4360 Photovoltaic Technology
(4 QH) TBA

Examines the theory, operation, installation, and monitoring of a photovoltaic power system. Topics include the physics of silicon photovoltaic cells: amorphous, polycrystalline, and single crystal. Lab included. *Prereq.* EET 4311 and PHY 4119.

EET 4362 Basic Power Systems 1
(4 QH) Fall 1992

Considers power transmission lines; line constants; current voltage and power relations; introduction to electric-power distribution loads, feeders, and substations; and application of matrices.

Prereq. EET 4354.

EET 4363 Basic Power Systems 2
(4 QH) Winter 1993

Studies symmetrical and unsymmetrical faults; protective devices—application and coordination; power flow in electric circuits; steady-state power limitations of systems; and voltage regulation theory and application. *Prereq.* EET 4362.

EET 4364 Basic Power Systems 3
(4 QH) Spring 1993

Examines computer applications to power systems with emphasis on load-flow studies; and basic ideas of systems planning, short-circuit studies, and system stability. *Prereq.* EET 4363.

EET 4370 Digital Computers 1
(4 QH) Fall

Introduces the field of digital computer design. Topics include general computer organization, number systems and number representations, design characteristics of major computer units, and Boolean Algebra applications to computer design.

Prereq. EET 4314.

EET 4371 Digital Computers 2
(4 QH) Winter

Examines microprocessor architecture and organization. Studies the machine language and assembly coding of an industry-accepted microprocessor. Assigns an assembly language coding problem and analyzes a suitable topic from the current literature.

Prereq. EET 4370.

EET 4377 Control Engineering 1
(4 QH) Winter

Analyzes linear servomechanisms under both transient and steady-state conditions. Topics include signal flow graphs and Laplace transforms used in the formulation of block diagrams, and transfer function. *Prereq.* EET 4354 and MTH 4122.

EET 4378 Control Engineering 2
(4 QH) Spring

Studies system stability, root locus techniques, treatment of Nyquist criteria, and Bode diagram methods for systems evaluation. *Prereq.* EET 4377.

**EET 4381 Telecommunications Systems 1
(4 QH) Fall**

Presents transmission system fundamentals, beginning with the development of the information to be transmitted in the form of voice, video, or data signals. Examines information transmission including baseband and multiplex systems. Stresses encoding analog signals into a digital format and multiplexing digital signals into the digital hierarchy. Also examines current digital transmission systems such as T-carrier, digital radio, and fiber optic systems. (Not open to electrical engineering technology majors.) *Prereq. EET 4152 or equiv.*

**EET 4382 Telecommunications Systems 2
(4 QH) Winter**

Introduces switching theory and practice, historical development, and circuit switching. Examines packet switching and the basics of traffic engineering. Considers time division versus space division switching, switching systems software, and digital switch architecture. (Not open to electrical engineering technology majors.) *Prereq. EET 4381.*

**EET 4383 Telecommunications Systems 3
(4 QH) Spring**

Continues EET 4381 and EET 4382 by examining networks comprised of switching and transmission equipments. Considers networks of particular interest to students, including the interaction between private (PABX or key systems) networks and the public (local telephone company) network. Discusses signaling systems that communicate between portions of the network. Involves developing a transmission level plan that will tie together the subject matter. (Not open to electrical engineering technology majors.) *Prereq. EET 4382.*

**EET 4384 Video Communications
(4 QH) Fall**

Examines the television signal, synchronization, balancing and interleaving, cameras, transmitters and receivers, video cassette recorders, video discs, and cable networks. (Not open to electrical engineering technology majors.) *Prereq. EET 4151 (may be taken concurrently with EET 4384), EET 4180, and PHY 4119.*

**EET 4391 Basic Optics and Optical Systems Design
(4 QH) Fall**

Involves developing the basics of optical imaging in the Gaussian approximation and analyzing the various designs stemming from lens aberration, intent and forms of optical systems, and flux throughput. Presents the essentials of a wave description of light along with instrumental designs for exhibiting

interference and diffraction. Assumes no previous background in optics. *Prereq. MTH 4108 and PHY 4119.*

**EET 4392 Optoelectronics and Fiber Optics
(4 QH) Spring**

Presents an overview of the various elements and their characteristics utilized in optical communication systems—elements that generate light (lasers, diodes); modulate light (as in scanning or information encoding); transfer light (optical fibers); detect light; and display and store light or its encoded information. *Prereq. EET 4393 and MTH 4108.*

**EET 4393 Applied Wave Optics
(4 QH) Winter**

Offers a wave optical approach to classical and modern imaging, and to interference/diffraction instrumentation and devices. Emphasizes a physically descriptive analysis of such applications as nondiffractive interference effects (interferometers, interference filters, high and anti-reflection films, and longitudinal 'laser' cavity modes) and diffraction effects (apertures and gratings). Also discusses wave imagery, image processing, and the 3-D imaging of holography; polarization phenomena and associated materials and devices; and basic quantum optics. *Prereq. EET 4391, MTH 4108, and PHY 4119 or permission of instructor.*

**EET 4399 Special Problems in Electrical
Engineering Technology (4 QH) TBA**

Engages students in theoretical or experimental work under individual faculty supervision. *Prereq. Permission of department chair.*

English

**ENG 4110 Critical Writing 1*
(3 QH) All Quarters**

Offers a detailed examination of the principles and methods of rhetoric, especially narration, description, and exposition. Coursework includes frequent practice in writing paragraphs and themes in those modes. *A writing proficiency test is given at the first class meeting.*

**ENG 4111 Critical Writing 2*
(3 QH) All Quarters**

Further examines the principles and methods of rhetoric, especially persuasion and argument, the study of short fiction, and the development of research skills. Coursework includes practice in writing persuasive and critical themes in preparing research papers. *Prereq. ENG 4110 or equiv.*

*This is a University College course offered at a different tuition rate.

General Engineering Technology

GET 4100 Computer Programming for Engineering Technology (4 QH) All Quarters

Introduces computers for problem solving using C Language. Topics include data types, arithmetic and logical expressions, programming loops, decision making, functions, arrays, and character string manipulation. Offers the use of the University's computer facility to run programs.

Prereq. MTH 4107 or concurrently.

GET 4138 Computer Programming for Telecommunications (4 QH)

This course has been replaced by GET 4100 Computer Programming for Engineering Technology.

GET 4170 Engineering Graphics 1 (4 QH) All Quarters

Introduces students to freehand, instrument, and computer engineering drawing using geometric constructions. Topics include descriptive geometry; orthographic projection; sections; and isometric, oblique, and perspective drawings. *Prereq. None.*

GET 4171 Engineering Graphics 2 (4 QH) Fall, Winter, Spring

Studies the use of computer and manual drawing in layout and assembly graphics. Course topics include manufacturing processes, fasteners, gears, welding, electric/electronic drawing, architectural/structural drawing, piping, and topography. A design project is required. *Prereq. GET 4170.*

GET 4172 Electrical Engineering Graphics (4 QH) Fall, Winter, Spring

This course has been replaced by GET 4171 Engineering Graphics 2.

GET 4306 Technical Communications (3 QH) Fall, Winter, Spring

Offers an opportunity to learn the style and content guidelines for technical writing, refines technical writing skills, and develops the ability to prepare and deliver oral presentations of a professional calibre. *Prereq. ENG 4110.*

GET 4364 Kinematics (4 QH) Winter

Presents four-bar linkages, sliders, and other devices using orthogonal components of vectors, instantaneous centers, equivalent linkages, and effective cranks. Emphasizes graphic solutions, and provides an introduction to the computer to enhance these concepts. Also covers reverted and epicyclic gear trains and cam displacement.

Prereq. GET 4171 and PHY 4117.

Human Resources Management

HRM 4301 Organizational Behavior* (3 QH) Fall

Examines the fundamentals of organizational life, emphasizing the structure and discipline of groups typically found in a business setting. Topics include issues and data related to leadership styles, employee motivation, and organizational dynamics. Significant student participation is required.

Prereq. None.

Industrial Engineering Technology

HS 4360 Engineering Economy (4 QH) Fall

Presents fundamental accounting concepts and terminology, including assets, liability, net worth, and the analysis of income statements and balance sheets. Discusses introductory steps in the analysis of investment proposals, time value of money, and cash flows. Analyzes cash flows in terms of present worth, annual worth, rate of return, and benefit/cost ratio. Considers depreciation and tax effects on cash flows. *Prereq. MTH 4107.*

IIS 4393 Engineering Probability and Statistics (4 QH) Winter

Studies the algebra of events and sets, and the laws of probability. Examines the properties of discrete and continuous random variables, including density function, expected value, variance, conditional probability, independent event, and Bayes' theorem. Presents common distributions: normal, uniform, and binomial. Also covers estimation of parameters of random variables, point estimation, confidence intervals, sampling statistics, central limit theorem, and associated sampling distributions.

Prereq. MTH 4122.

Industrial Management

IM 4301 Introduction to Operations Management* (3 QH) Winter

Surveys the concepts and principles of operations from a management point of view. Looks at operations in relation to other business functions and

*This is a University College course offered at a different tuition rate.

as a transformation process, with inputs of materials, investment, and people producing finished goods/services. Topics include product and process design, forecasting demand, capacity planning, facilities design, aggregate planning, scheduling, and quality control and assurance.

Prereq. MS 4325 or equiv.

IM 4314 Productivity Enhancement and Quality* (formerly Production Control and Inventory Management) (3 QH) Winter

Studies the fields of quality control and productivity as a body of managerial, technological, behavioral, and economic knowledge, and examines the organized application of this knowledge to the practical improvement of operations. Considers current productivity improvement programs such as measurement and control, and explores the relationship between increased productivity and managing for higher quality. Reviews current management practices of quality control, approaches to optimizing quality, economics of total quality, internal and external quality, and management of long-term quality and reliability. *Prereq. MS 4332.*

Management

MGT 4101 Introduction to Business and Management 1* (3 QH) All Quarters

Examines the setting and general structure of American business, including objectives and practices affecting the American standard of living. Topics include the characteristics of private enterprise and the nature and challenge of capitalism and other forms of economic enterprise. Introduces types of businesses, the structures of organizations, and the functions of management. Considers what a managerial career involves, what problems must be faced, and what decisions must be reached. *Prereq. None.*

Management Science

MS 4332 Statistical Quality Control* (3 QH) Fall

Offers a practical course in analytical methods of modern quality control, emphasizing the application of basic statistical controls in the industrial environment. Topics include control charts, statistical tolerancing, acceptance sampling techniques, life testing, and reliability concepts.

Prereq. ECN 4251 or equiv.

Manufacturing Engineering Technology

MFG 4311 Manufacturing Materials and Processes 1 (4 QH) Spring

Examines the structures of polymers (thermoplastics, thermosetting, glass, and rubber); manufacturing processes for polymers; thermoforming; structures of metals; and the manufacturing processes for metal forming. Also covers alloys, nonferrous metals, and various manufacturing methods and processes. *Prereq. CHM 4101 or CHM 4111, and PHY 4117.*

MFG 4312 Manufacturing Materials and Processes 2 (4 QH) Fall

Continues MFG 4311. *Prereq. MFG 4311.*

MFG 4313 Modern Manufacturing Materials and Processes (4 QH) TBA

Covers advanced manufacturing processes and advanced manufacturing materials being utilized in industry. Topics include advanced forming techniques of materials, advanced coating methods of materials, advanced deburring techniques, advanced metal removal techniques, and advanced materials such as composites and ceramics. *Prereq. MFG 4312*

MFG 4321 Computer-Aided Manufacturing 1 (4 QH) Fall

Gives an overview of computer-aided manufacturing (CAM), including group technology; material requirements planning; part coding and classification; numerical control; part programming; and management systems. Covers each area to instill an appreciation of the coming reality of the automated factory. *Prereq. None.*

MFG 4322 Computer-Aided Manufacturing 2 (4 QH) Winter

Continues MFG 4321. *Prereq. MFG 4321.*

MFG 4331 Computer Methods in Manufacturing Design 1 (4 QH) Fall

Investigates the use of computers in selected areas of manufacturing systems design. Topics include numerical control, MRP II, computer-aided process planning and control, and other important applications of computers to manufacturing. *Prereq. MFG 4311 and MFG 4322.*

MFG 4332 Computer Methods in Manufacturing Design 2 (4 QH) Winter

Continues MFG 4331; *Prereq. MFG 4331.*

MFG 4341 Introduction to Computer-Aided Design (4 QH) Winter

Introduces computational and numerical geometry for design, and studies the implementation of

*This is a University College course offered at a different tuition rate.

computer graphics in design and use of computer-aided design packages, as well as principles of numerical control techniques in design and manufacture. Involves a design project. *Prereq.* GET 4100 or FORTRAN.

MFG 4351 Assembly Automation
(4 QH) Spring

Examines the field of automatic assembly; topics include automatic vibratory feeders, nonvibratory feeders, and the automatic orientation of parts to be fed. Also covers the economics of automatic assembly. Involves designing an automated assembly system if time permits. *Prereq.* MFG 4322 and MFG 4332.

MFG 4361 Numerical Controlled Machines (Basic)
(4 QH) Fall

Begins with a week-long review of numerical controlled machines from material covered in MFG 4321 and MFG 4322. Provides an introduction to DNC and CNC systems followed by the study of numerical controlled machines and programming in the APT programming language. *Prereq.* MFG 4322, MFG 4332, and MFG 4341.

MFG 4371 Robotics
(4 QH) Winter

Discusses the concept, classification, and structure of robots and their application in manufacturing. Topics include drive and control systems; kinetics, coordinate transformations, and trajectory interpolators; and the application, programming, and integration of robots into the manufacturing environment. *Prereq.* MFG 4361.

MFG 4381 Plant Layout and Design
(4 QH) Fall

Examines the use of descriptive and optimizing models—for example, simulation, queuing theory, and linear programming—to design facilities and associated material handling systems. Applies computer-assisted layout analysis techniques to practical problems. *Prereq.* IM 4301 and IIS 4360.

MFG 4390 Special Topics in Manufacturing Technology (4 QH) TBA

Focuses on special or advanced topic areas that are of particular interest in the manufacturing area. *Prereq.* Permission of the instructor or student faculty adviser.

MFG 4391 Independent Study in Manufacturing Technology (4 QH) TBA

Offers theoretical and experimental work under individual faculty supervision. *Prereq.* Student must obtain a course faculty adviser.

MFG 4392 Special Problems in Manufacturing Technology (4 QH) TBA

Selected advanced problems in manufacturing technology chosen by the instructor. *Prereq.* Permission of the instructor and student adviser.

MFG 4393 Special Problems in Manufacturing Technology (4 QH) TBA

Selected advanced problems in manufacturing technology chosen by the instructor. *Prereq.* Permission of the instructor and student adviser.

Mathematics

MTH 4006 Technical Mathematics
(4 QH) All Quarters

Reviews high school algebra equations, formulas, exponents, polynomials, factoring, scientific notation, fractions, radicals, quadratic equations, and linear equations and their applications. (Credit cannot be used in the associate in engineering, associate in science, or the bachelor of science in engineering technology degree programs.)

Prereq. None.

MTH 4107 College Algebra
(4 QH) All Quarters

Offers a diagnostic exam to insure the proper placement of students in the course. Course topics include interval notation, integer and rational exponents, factoring, operations with fractional expressions, operations with radicals and complex numbers, Pythagorean theorem, linear and quadratic equations and inequalities, distance and midpoint formulas, and functional notation. Also covers graphing of functions including straight lines, absolute value, polynomials, exponential and logarithmic; solving equations involving radicals; and solving polynomial, exponential, and logarithmic equations. Involves use of scientific calculator.

Prereq. Math diagnostic exam or MTH 4006 or equiv.

MTH 4108 Pre-Calculus
(4 QH) All Quarters

Examines trigonometric functions of angles in degrees and radians; trigonometric identities and equations; right triangles; law of sines and cosines; inverse trigonometric functions; polar coordinates; complex numbers in trigonometric form; systems of linear and nonlinear equations; determinants; binomial theorem; arithmetic and geometric sequences and series; and conic sections. *Prereq.* MTH 4107.

MTH 4120 Calculus 1
(4 QH) All Quarters

Studies plane analytic geometry of the line and circle. Reviews inequalities and general function operations, theory and evaluation of limits, derivatives of algebraic and trigonometric functions, general rules of differentiation, Rolle's theorem, and Mean Value theorem. Also covers applications of differentiation including velocity; and acceleration, related rates, maximum, minimum, curve sketching, and approximations by differentials. Examines solving the equation $f(x) = 0$ by applying Newton's method.

Prereq. MTH 4108.

MTH 4121 Calculus 2
(4 QH) All Quarters

Examines antiderivative and development of the fundamental theorem with applications to areas, volumes, and rectilinear motion problems. Topics include the logarithmic exponential and inverse trigonometric functions and their applications; techniques of integration including parts, partial fractions, substitution, and the use of tables; numerical integration (Simpson's and Trapezoidal rules); L'Hospital's Rule; improper integrals; and the geometry of vectors in a plane and space. *Prereq. MTH 4120.*

MTH 4122 Calculus 3
(4 QH) All Quarters

Studies three-dimensional space and a treatment of functions of several variables; multiple integrals with applications in areas and volumes; sequences and series; and differential equations, including the solution with applications of first-order with variables separable, first-order linear, and second-order linear homogeneous to complete the sequence. *Prereq. MTH 4121.*

MTH 4123 Differential Equations
(4 QH) Fall, Winter, Spring

Examines linear differential equations with constant coefficients, homogeneous and nonhomogeneous. Explores the variation of parameters and undetermined coefficients and simultaneous differential equations, the Laplace transform, series solution of differential equations, and the Fourier series. Studies orthogonal functions and numerical solutions of differential equations. *Prereq. MTH 4122.*

Mechanical Engineering Technology

MET 4301 Mechanics A
(4 QH) Fall

Studies the forces, moments, couples, and statics of particles and rigid bodies in two and three dimensions. Examines external and internal distributed forces, first moments and centroids, as well as structure-trusses, frames, and machines. *Prereq. MTH 4120 and PHY 4117.*

MET 4302 Mechanics B
(4 QH) Winter

Explores friction, second moments, and virtual work; the kinematics of particles; force, mass and acceleration; work and energy. *Prereq. MET 4301.*

MET 4303 Mechanics C
(4 QH) Fall

Studies the impulse and momentum of particles; the kinematics and dynamics of rigid bodies, force, mass, and acceleration; and the dynamics of rigid bodies—work and energy. Also covers introduction to mechanical vibration. *Prereq. MET 4302.*

MET 4314 Stress Analysis A
(4 QH) Winter, Spring

Examines axially loaded members, stress and strain, allowable stresses, factor of safety, temperature effects, and indeterminate members. Other topics include shear and moment diagrams; flexural and transverse shearing stresses in beams; torsional stresses and deformations; and power transmission. *Prereq. MET 4301.*

MET 4315 Stress Analysis B
(4 QH) Fall, Spring

Presents determinate and indeterminate beam deflections and reactions by various methods, including integration and moment-area and superposition methods. Topics include thin-walled pressure vessels and centric loading of bolted and welded connections; eccentric loads on beams and riveted and welded joints; combined stresses; principal stresses; Mohr's circle; theories of failure; and column design. *Prereq. MET 4314.*

MET 4319 Mechanics
(4 QH) Spring

Provides an introduction to mechanics for non-mechanical majors. Studies the static analysis of forces acting on particles and rigid bodies in 2- and 3-dimensions. Also discusses centroids and centers of gravity and moments of inertia. Considers the kinematics and kinetics of particles and rigid bodies. *Prereq. MTH 4120 and PHY 4117.*

MET 4330 Mechanical Design A
(4 QH) Winter

Introduces the principles of mechanical design, the design process, design factors, creativity, optimization, human factors, and value engineering through simple design projects. Examines principles of design, properties, and selection of materials; stress concentrations; strength under combined stresses; theories of failure; impact; and fluctuating and repeated loads. *Prereq. MET 4314 and MET 4380.*

MET 4331 Mechanical Design B
(4 QH) Spring

Continues MET 4330 and further develops the methodology of design as applied to products, processes, and equipment. Also studies the deformation and design of fasteners, screws, joints, springs, and bearings, lubrication, and journal bearings. Covers stresses and power transmission of spur, bevel, and worm gear; shaft design, and clutches and brakes. *Prereq. MET 4330.*

MET 4340 Thermodynamics A
(4 QH) Fall, Winter

Introduces the general theory of heat and matter; first law of thermodynamics for open and closed systems (law will be applied to nozzles, turbines, compressors, and heat exchangers); energy-transformation principles and availability of energy; and properties and processes for pure substances, liquids, and ideal gases. Also covers

thermodynamic properties using tables and charts; mixtures of fluids; and vapor cycles.

Prereq. CHM 4111 and PHY 4118.

MET 4341 Thermodynamics B

(4 QH) Winter

Discusses the second law of thermodynamics for open and closed systems; internal combustion engines; theory of gas and vapor flow through orifices and nozzles; design and performance of steam and gas turbines; gas power cycles; vapor and combined power cycles; and refrigeration cycles.

Prereq. MET 4340.

MET 4342 Refrigeration and Air-Conditioning

(4 QH) Spring

Introduces air-conditioning principles, including psychometrics and heat pumps. Topics include calculation of heating and cooling loads in accordance with ASHRAE practices; principles of gas compression; analysis of vapor compression; refrigeration systems; low-temperature refrigeration cycles; and absorption refrigeration systems. *Prereq.* MET 4341.

MET 4343 Heat Transfer

(4 QH) Fall

Presents the basic principles of heat transfer: thermal conductivity and thermal conductance/resistance. Examines heat transfer mechanisms, the basic equations of conduction, and natural and forced convection. Studies the hydrodynamic and thermal boundary layers, black body radiation, and Kirchoff's law. Other topics include emissivity and absorptivity, the radiation between simple bodies, heat transfer coefficients, heat exchanger effectiveness, and regenerative and evaporative heat exchangers. *Prereq.* MET 4341.

MET 4370 Fluid Mechanics A

(4 QH) Spring

Examines hydrostatics; principles governing fluids at rest; pressure measurement; hydrostatic forces on submerged areas and objects; simple dams; fluids in moving vessels, and hoop tension. Discusses fluid flow in pipes under pressure; fluid energy, power, and friction loss; Bernoulli's Theorem; and flow measurement. *Prereq.* MET 4302.

MET 4371 Fluid Mechanics B

(4 QH) Winter

Considers pipe networks and reservoir systems, flow in open channels, and uniform flow. Also covers energy, friction loss, minor losses, velocity distribution, alternate stages of flow, critical flow, nonuniform flow, accelerated and retarded flow, and hydraulic jump and waves. *Prereq.* MET 4370.

MET 4380 Materials A

(4 QH) Spring

Identifies methods of selection of materials for engineering applications. Topics include fundamental metallic, ceramic, and polymer structures; general information covering theoretical aspects of proper-

ties; testing and failure of materials; alloying and hardening of metals; refinement of metals; equilibrium diagrams; characteristics of engineering metals; and introduction to principles of metal fabrication. *Prereq.* None.

MET 4390 Measurement and Analysis Laboratory (3 lab, 2 QH) Fall

Discusses experiments requiring collection and analysis of data by graphical and numerical methods. Examines computer applications and report writing to draw conclusions relative to accuracy, precision, true values, and measured values as they relate to basic mechanical measuring instruments. *Prereq.* GET 4100, MET 4314, MTH 4122, and PHY 4119.

MET 4391 Technology Laboratory A

(3 lab, 2 QH) Winter

Conducts experiments to determine mechanical properties of materials under normal and abnormal environmental conditions. Experiments include tension, bending, torsion, creep, and fatigue. *Prereq.* MET 4315, MET 4380, and MET 4390.

MET 4392 Technology Laboratory B

(3 lab, 2 QH) Spring

Conducts experiments to determine the physical properties of incompressible fluids, measure flow rates and velocities utilizing pitot tubes, orifice plates, venturii meter, and weirs flow meters, U-tube differential manometers, and piezometers. *Prereq.* MET 4370 (may be taken concurrently) and MET 4390.

MET 4393 Technology Laboratory C

(3 lab, 2 QH) Fall

Explores basic thermodynamic relationships. Conducts experiments to examine the flow of compressible fluids and steam and to examine the energy conversion of a fuel into a working substance. Examines related heat transfer mechanisms along with operating characteristics of thermal generators, engines, and compressors. *Prereq.* MET 4341 and MET 4390 (may be taken concurrently).

MET 4394 Technology Laboratory D

(3 lab, 2 QH) Winter

Conducts experiments to examine the operating characteristics and efficiencies of internal combustion engines, brake horsepower, indicated horsepower, mean effective pressure, fuel consumption, torque, ignition timing, manifold pressure, and compression ratios and internal engines as energy conversion systems. Also covers energy conversion of fuels. *Prereq.* MET 4341, MET 4343 (may be taken concurrently), and MET 4393.

MET 4395 Technology Laboratory E

(3 lab, 2 QH) Spring

Offers advanced and specialized experiments in refrigeration, air-conditioning, and heating pump cycles. *Prereq.* MET 4342, MET 4343, and MET 4390.

MET 4414 Mechanical Vibrations
(4 QH) TBA

Studies the elements of vibrating systems, one degree of freedom, natural frequencies, damped free and forced vibration, impedance and mobility, systems with more than one degree of freedom, and vibration absorber. *Prereq. MET 4303.*

MET 4415 Experimental Stress Analysis
(4 QH) TBA

Examines theory and experimentation showing the application of extensometers and electrical strain gauges and transducers in the field of experimental stress and strain analysis. Also covers theory and laboratory practice on photoelastic methods as applied to classical model analysis and modern coating analysis. *Prereq. MET 4315.*

MET 4416 Stress Analysis C
(4 QH) Spring

Discusses curved beams, nonsymmetrical bending of beams, shear center and shear stresses on thin sections, and composite beams. Also covers columns, energy absorption and resilience, inertial stresses, impact loading, deflection of beams by energy methods, and bolted fastenings. *Prereq. MET 4315.*

MET 4444 Power Generation
(4 QH) TBA

Explores electrical power generation by thermomechanical, electromechanical, nuclear, and hydraulic systems. Emphasizes the analysis of thermodynamic cycles as well as the practical deviations from the related ideal processes. Considers accessory and auxiliary equipment used in such systems. Studies design, performance, economic factors, and public issues affecting electric power generation. *Prereq. MET 4341.*

MET 4481 Materials B
(4 QH) Spring

Discusses polymer, composite, and ceramic materials; electrical and magnetic properties; and applications for the fabrication and use of both metals and nonmetals. Examines structures of metals, imperfections, and properties of nonferrous metals. Discusses fabrication methods including powder metallurgy, metal-working, casting, molding, machining, welding, and manufacturing methods. Offers experiments in preparation of samples and microstructure/analysis, and additional lab work in the construction of cooling curves and binary phase diagrams. *Prereq. MET 4380.*

MET 4482 Applied Metallurgy
(4 QH) TBA

Examines mechanical properties of ferrous metals, the iron carbon diagram, high-temperature alloys, hardening methods, impact tests, and the effects of environment. Also discusses manufacturing processes and methods of fabrication. Offers experiments in the analysis of stress-strain diagrams, heat

treatment, surface corrosion, tempering, and drawing, as well as ferrous and nonferrous metals.

Prereq. MET 4481.

Physics

PHY 4101 College Physics 1
(4 QH) Fall, Summer

Introduces students to mechanics, including units of measurement, vectors, accelerated motion, and Newton's laws of motion. Topics include conservation of energy, work, momentum, elements of heat, mechanical waves, and vibrating bodies. Includes laboratory experiments and classroom demonstrations as an integral part of the course. (This course is intended for health professions and science programs and cannot be used for credit towards technology degrees in the School of Engineering Technology.) *Prereq. None.*

PHY 4102 College Physics 2
(4 QH) Winter, Summer

Introduces magnetism, magnetic fields, electromagnetic induction, electrostatics and electric circuits. Discusses appropriate topics in optics, nuclear and atomic physics. Involves frequent laboratory experiments and classroom demonstrations. (This course is intended for the health professions and science programs and cannot be used for credit towards technology degrees in the School of Engineering Technology.) *Prereq. PHY 4101.*

PHY 4117 Physics 1
(4 QH) All Quarters

Introduces vectors and balanced forces, accelerated motion, projectile motion, Newton's laws, work and energy, momentum, and equilibrium of rigid bodies. *Prereq. MTH 4107 or concurrently.*

PHY 4118 Physics 2
(4 QH) All Quarters

Explores rotational motion, periodic motion, electric forces and fields, electric potential, capacitance, electromotive force, and direct current circuits. *Prereq. PHY 4117*

PHY 4119 Physics 3
(4 QH) All Quarters

Covers magnetic fields and forces, electromagnetic induction, inductance, Gauss's law, electromagnetic waves, mechanical waves, sound, and the interference and diffraction of light. *Prereq. PHY 4118.*

PHY 4196 Physics Laboratory 1
(1 QH) All Quarters

First in a three-quarter sequence for School of Engineering Technology students. Laboratory course that accompanies PHY 4117. Provides experiments selected from physics topics covered concurrently in PHY 4117. *Prereq. PHY 4117 concurrently.*

PHY 4197 Physics Laboratory 2
(1 QH) All Quarters
 Second in a third-quarter sequence for School of Engineering Technology students. Laboratory course that accompanies PHY 4118. Provides experiments selected from physics topics covered in PHY 4117 and PHY 4118. *Prereq. PHY 4118 concurrently and PHY 4196.*

PHY 4198 Physics Laboratory 3
(1 QH) All Quarters
 Third in a three-quarter sequence for School of Engineering Technology students. Laboratory course that accompanies PHY 4119. Provides experiments selected from physics topics covered in PHY 4118 and PHY 4119. *Prereq. PHY 4119 concurrently and PHY 4197.*

Northeastern University



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A Profile of Northeastern

At Northeastern University, we value part-time evening and weekend students as highly as we do our full-time students. You are important members of the academic community and reflect the changing profile of today's college student, which encompasses new concerns for lifelong learning and professional retraining. Northeastern supports your pursuit of personal and professional goals and wants to contribute to your success. In return, you contribute to the intellectual and cultural diversity upon which this urban institution thrives. You may take full advantage of the academic resources and facilities we offer and join all our students who are recognized and supported by the University's faculty and administration.

Founded in 1898, Northeastern University is incorporated as a privately endowed, nonsectarian institution. From its beginning, the University's mission has been to identify and address the educational needs of a diverse community and student body in distinctive and useful ways. Northeastern did not duplicate the programs of other academic institutions, but instead became a world leader in new areas of educational service. Today, the University is comprised of seven undergraduate colleges and nine graduate schools. Our undergraduate colleges are:

- Bouvé College of Pharmacy and Health Sciences*
- College of Arts and Sciences, including the School of Journalism
- College of Business Administration
- College of Computer Science
- College of Criminal Justice
- College of Engineering, including the School of Engineering Technology
- College of Nursing

Our graduate schools are:

- Graduate School of Arts and Sciences
- Bouvé Graduate School of Pharmacy and Health Sciences*
- Graduate School of Business Administration

*Structure and name pending approval of the Supreme Judicial Court of Massachusetts.

- Graduate School of Computer Science
- Graduate School of Criminal Justice
- Graduate School of Engineering
- Graduate School of Nursing
- Graduate School of Professional Accounting
- School of Law

At Northeastern, we respond to the needs of people who already hold jobs or are launched in careers but who wish to advance or change their professional lives. There are also classes for people pursuing personal interests. The University offers a variety of educational options—both credit and noncredit—to suit your particular objectives. The School of Engineering Technology offers part-time evening and weekend associate's and bachelor's degree programs in technological areas, in addition to daytime undergraduate programs. University College, so named because it draws upon the resources of Northeastern's other colleges, offers part-time day and evening programs leading to certificates and to associate's and bachelor's degrees.

All formal courses of study leading to degrees through part-time programs are approved by the full-time day faculty of Northeastern's Basic Colleges and are governed by the same qualitative and quantitative standards.

Where You'll Find Northeastern

The main campus of Northeastern University is a vibrant and progressive urban community. To all Northeastern students, the physical setting of the Boston campus extends opportunities to participate in the dynamic, exciting environment that we share with city residents. Built around a quadrangle, the campus is divided by Huntington Avenue, a major artery. It is located in the midst of such cultural landmarks as Symphony Hall, the Museum of Fine Arts, the Isabella Stewart Gardner Museum, Horticultural Hall, and the Boston Public Library. You can walk to Frederick

Law Olmsted's Fenway Park, Copley Place, the Back Bay shopping district, and a number of internationally renowned hospitals. In 1910, the University began construction on the first piece of land acquired at its present site; it is now more than fifty-five acres.

The Boston campus is ideally situated for easy commuting. The MBTA Orange and Green lines provide rail service to the heart of the campus. Use either the Orange Line's Ruggles Street station or the Green Line's Northeastern University stop along the Arborway Branch to arrive on campus. The MBTA also has numerous bus routes that run along Huntington and Massachusetts avenues, which are the two major city streets closest to the campus. Finally, if you need to drive to Northeastern, student parking is available at reasonable rates in University-owned parking lots.

To reach increasing numbers of students and to make participation in our programs as convenient as possible, Northeastern University has established a number of suburban campuses and branch locations, as well as several off-campus athletic facilities. The campuses and branch locations house administrative and classroom facilities for Northeastern's graduate, part-time day and evening, and continuing education programs. The University also maintains many affiliations to ensure access to facilities and specialized equipment available at other institutions and organizations.

One of Northeastern's most recent acquisitions is the twenty-acre Dedham campus, just north of Route 128. This facility houses the Center for Continuing Education and space for the College of Business Administration's High Technology MBA Program.

Near the junction of Routes 128 and 3 in Burlington is the Suburban Campus of Northeastern University. Part-time undergraduate courses in a variety of subject areas and part-time graduate courses in engineering and business administration are offered. The Burlington campus also offers special programs for part-time, evening, and noncredit continuing education courses.

Situated on fifty acres in Ashland, the Warren Center provides a practical laboratory for outdoor education and conservation and for camping administration, programming, and counseling. In the summertime, the center becomes an attractive campsite for various community and University groups and is available for conferences and workshops.

Twenty miles northeast of Boston, the Marine Science and Maritime Studies Center is located

in Nahant, on Massachusetts Bay. It serves as a site for national, international, and University research.

Henderson House, Northeastern University's conference center, is located twelve miles from Boston in suburban Weston. This facility hosts a variety of activities, including residential seminars, workshops, short courses, and weekend meetings.

Network Northeastern

Network Northeastern uses the microwave-based Instructional Television Fixed Service (ITFS) system to broadcast courses to subscriber companies and to the Burlington and Dedham campuses. The network telecasts live classroom instruction to remote sites where students interact with instructors via a telephone-based talkback system. A courier service collects and delivers course materials and serves as the off-campus student's link to academic and administrative departments.

Network Northeastern currently broadcasts educational programs to over thirty local corporations. Courses are offered in graduate engineering, graduate computer science, undergraduate engineering technology, and state-of-the-art programs for professional development. Network Northeastern also delivers graduate level and short courses to corporations throughout the United States via satellite.

University Libraries

Together, the collections, services, staff, and facilities of the Northeastern University Libraries provide access to information and an understanding of the organization of the literature and other information resources of the academic disciplines. The library is integral to the academic and research processes, whether these occur in a formal classroom, seminar, or laboratory setting or through individual study and enrichment.

All students, whether full-time or part-time, have full access to all units of the University Libraries located on the Boston, Burlington, and Dedham campuses and at the Marine Science Center in Nahant.

Snell Library, a centralized library for the Boston campus has 2,800 seats on five levels and

shelving for more than 1.25 million volumes. Library services incorporate online, telecommunication, and media technologies that are associated with information resources, including an online catalog and circulation system, microcomputer and language laboratories, and a CD-ROM optical disc network.

Total holdings of the University Libraries include more than 690,000 volumes; 1,550,000 microforms; current subscriptions to over 7,500 serials and newspapers; 150,000 government documents; and 19,000 audio, video, and computer software titles.

Library staff are available in all service areas to assist students. Librarians provide instruction to groups and to individuals on the bibliographic research process and on strategies for identifying, locating, and using information resources. Each term, a series of tutorials is offered giving students further opportunities to meet with a librarian to discuss particular or specialized research needs.

Northeastern University is a member of the Boston Library Consortium, a cooperative arrangement among the following academic and research institutions: Boston College, Boston Public Library, Boston University, Brandeis University, Massachusetts Institute of Technology, the State Library of Massachusetts, Tufts University, the University of Massachusetts (Amherst and Boston campuses), and Wellesley College. The University's membership in the Boston Library Consortium generally allows for on-site use by, but does not grant borrowing privileges to, students at Northeastern. Some of the consortium libraries and many of the other libraries in the Boston area require that a visiting student present a special pass or letter of introduction. A Northeastern reference librarian can advise about such student visitor policies.

Engineering Computer Center

The Engineering Computer Center provides user support for Northeastern Engineering and Technology students and faculty. The staff are full-time professionals who administer the systems, deliver training, maintain hardware and provide software support. The center's labs, open seven days a week with competent user assistants available to answer questions, provide student access to PCs, Macintoshes, VAX and Sun Microcomputers, and high-end workstations for CAD and VLSI design.

Division of Academic Computing

The Division of Academic Computing (DAC) facilitates the use of computers by Northeastern students and faculty.

The division's Personal Computing Initiative supports personal computing with negotiated discounts on hardware and software (available through the Northeastern Computer Store) and with advice, training, and assistance on personal computer use.

The division and its Computing Resource Center (CRC) maintain the *lynx* communication system for the exchange of computer mail and conference discussions. Participation in *lynx* is available to any member of the Northeastern community free of charge. To apply for a *lynx* account, bring a valid Northeastern student identification card to 39 Richards Hall during business hours.

The Computing Resource Center also maintains mainframe computing resources (most notably the VAX 8650 system) and numerous public-access laboratories of personal computers and terminals on the Boston, Dedham, Burlington, and Liberty Square campuses.

Ell Student Center

Students enjoy a variety of recreational and co-curricular activities at the Carl S. Ell Student Center. The center houses Blackman Auditorium, which seats 1,300; a ballroom; main lounge; student offices; conference rooms; PC lab and typing room; full-service copy center; gameroom; cafeteria with seating for more than 1,000; and the University Bookstore.

Sport, Dance, and Exercise Facilities

Northeastern is concerned with providing for the health and fitness of students and continually expands the sports, exercise, and recreational options available. All part-time students have access to extensive gymnasium facilities from 4:00 PM to 9:30 PM, Monday through Friday, and

during all open hours on Saturday, Sunday, and holidays. The University offers a variety of specialized facilities, including basketball courts, dance studio, indoor athletic field and running track, gymnastics room, combatives room, weight-training rooms, swimming pool, crew practice tank, racquetball courts, tennis courts, and motor performance and exercise physiology laboratories. The Matthews Arena, with seating for more than 5,000 fans, is home to the University's varsity and subvarsity hockey and basketball teams.

For organized athletics requiring facilities not available on the main campus, Northeastern maintains the Northeastern University Boat House, which is located on Memorial Drive in Cambridge and is home to the University's crew teams. The Edward S. Parsons Field, on Kent Street in Brookline, is the playing ground for the football, baseball, women's lacrosse and women's field hockey teams, and some intramurals. The Bernard M. and Jolane Solomon Track, a recently completed outdoor track and field facility in Dedham, has an eight-lane, Action Trak 200 running surface and an expansive area for concurrent jumping and field events. This new facility is ready to host dual and championship meet competitions and is a permanent site for Northeastern University track athletes.

You must present a valid Northeastern student identification card and a photo identification card for access to the facilities.

Social and Professional Clubs

We welcome and encourage part-time students in the School of Engineering Technology and University College to join in the social and professional activities that are organized and run by the student body, with the assistance of the director of the Office of University College–School of Engineering Technology Student Activities. If you and your peers are interested in starting new professional clubs, the office will help to plan and organize locally and nationally.

All programs are designed to keep pace with changing student needs and interests and to provide maximum opportunity for your participation.

Disability Resource Center

The Disability Resource Center's (DRC) mission within the University is to enable people with disabilities equal access to higher education via support services and advocacy. The center provides support services on an individual basis. Accommodations include but are not limited to: orientation, quarterly registration assistance, counseling, referral, and HP parking.

Before receiving services, individuals must voluntarily register their disability-related needs with the DRC. Registering requires providing the DRC with recent diagnostic documentation of their disability. The center's services are individually designed to meet the student's needs.

The Counseling Center

Confidential counseling and testing is available to full- and part-time students to address career, educational, or personal concerns. Assistance is available to all students during days and certain weekday evenings until 8:30 PM at the Counseling Center. For information and appointments, call 617-437-2142 or drop in at 302 Ell Building.

Lane Health Center

A comprehensive program of medical care is provided to all students registered in full-time Basic Colleges and Graduate School programs at the Lane Health Center, 135 Forsyth Building. There are staff physicians available on a walk-in basis Monday-Friday 9:00 AM-4:30 PM and a nurse is on duty at all times when the clinic is closed. An emergency telephone number (617-437-2772) is answered by the nurse on duty who will make appropriate arrangements for any urgent situation, nights, weekends and holidays.

Department of Career Development and Placement

The Department of Career Development and Placement provides a variety of professional development services to Northeastern students and alumni. The services enable students to plan for career advancement. Students already working in their chosen fields may receive assistance in identifying career paths and developing a network of professional contacts. Others may receive assistance with career placement.

Services available to students and alumni/ae include career counseling, job search seminars, career expos, and resume matching. Students and alumni/ae may use the Career Resource Center, which contains valuable career planning material, a job bank of employment opportunities, the Northeastern National Career Network, and files on over 1,200 companies.

The On-Campus Recruiting program offers students receiving a bachelor's degree in the current academic year the opportunity to interview on campus with representatives of business, industry, government, and nonprofit organizations. Over 250 employers conduct interviews on campus during the fall and winter recruiting seasons.

The department is located on the Boston campus in 124 Ryder Hall. Counselors are available to students and alumni/ae by appointment. Office hours from September to June are 8:30 AM–4:30 PM Monday, Wednesday, Thursday, and Friday; and 8:30 AM–8:00 PM on Tuesday. Office hours during July and August are 8:00 AM–5:00 PM, Monday through Thursday. For further information or an appointment, call 617-437-2430.

Cooperative Plan of Education

The University is known worldwide for its Cooperative Plan of Education, under which students alternate periods of work and study. Our time-tested, widely acclaimed method of education enables students to gain valuable hands-on, practical experience in their chosen fields as an integral part of their college programs. The Co-op Plan also allows students to earn money to offset tuition or related costs. All of Northeastern's undergraduate day colleges operate on the Cooperative Plan, and several of the University's graduate schools have structured their programs to include the features of cooperative education.

Alumni Association

Upon graduation, you will join the more than 114,000 alumni united within the Alumni Association, which was established to promote a mutually rewarding relationship between Northeastern and its graduates. Association activities including the Homecoming celebration, presentation of the Outstanding Alumni Awards, and the annual presentation of Professional Promise Awards to outstanding seniors in each of the colleges.

Administrative Information

Admissions

The Student Body

The student body of the School of Engineering Technology is composed of both recent high school graduates and adults. Most students are employed in industry, with a range of vocational experience. They represent many technical career categories—industrial, engineering, scientific, and allied-medical, demonstrating that, in our increasingly complex society, the key to personal advancement is education.

Academic Background

A firm knowledge of the fundamentals of mathematics and science is necessary for success in the more advanced technological courses.

All applicants to the School of Engineering Technology are required to be proficient in both English and mathematics. In order to enroll in ENG 4110 Critical Writing 1 or MTH 4107 College Algebra, you must satisfactorily complete an English and a mathematics skills test.

Students who lack the required English or mathematics skills must take the appropriate review course. In addition, students who feel uncomfortable with the level of their English or mathematics skills are encouraged to enroll in review courses as well. The next paragraphs describe the review courses available at the School of Engineering Technology. The review courses are offered on a noncredit basis only.

ENG 4005, ENG 4006, and ENG 4007 English for International Students 1–3

This is a three quarter sequence of courses for foreign speaking students that provides intensive training in the English language. Students are introduced to English grammar, with an emphasis on listening, speaking, and writing. The preparation of written and oral reports, as well as business and social correspondence, is required. In the final quarter, advanced work in

written and spoken English prepares the students for ENG 4110 Critical Writing 1.

ENG 4011 Elements of Writing

This is a writing course that reviews English grammar, and offers practice in writing sentences, paragraphs, and short papers. The course prepares students for ENG 4110 Critical Writing 1.

MTH 4006 Technical Mathematics

This is a mathematics course that reviews high school algebra and prepares students for MTH 4107 College Algebra.

Program Counseling

If you are attending the School of Engineering Technology for the first time, we recommend that you meet with a program counselor who will assist you in planning an academic program. (If possible, please bring school transcripts to the counseling session.) Counselors are available evenings and Saturdays at the main campus in Boston most of the year; a special schedule is prepared for the summer. Counseling at the Burlington, Dedham, and Marlboro campuses is available on selected evenings during the registration period prior to each quarter. For further information, contact the School of Engineering Technology at 617-437-2500.

Special Students

Our open enrollment policy allows you to enroll in courses without making a formal application. As long as you have the proper prerequisites or their equivalent, you can enroll as a special student.

Degree Candidates

To graduate from the School of Engineering Technology you must be accepted as a degree candidate in a program. An application for

degree candidate status is available from the School of Engineering Technology office in Boston (120 Snell Engineering Center, 617-437-2500).

To declare a major, you must do the following.

1. Complete sixteen quarter hours in the School of Engineering Technology degree program at a minimum cumulative quality-point average of 2.00 (a grade of C).
2. Present a high school diploma or its equivalent (GED).

Once your application for admission to a degree program is approved, a change of status will be recorded on your permanent record and any advanced standing credit will be posted.

Full-Time Students

In addition to the part-time programs described in this publication, the School of Engineering Technology offers full-time day cooperative education programs. Interested students can apply through the Office of Undergraduate Admissions, 617-437-2200.

Readmission

If you are a former student seeking readmission to the School of Engineering Technology, we suggest you schedule a meeting with a program counselor to determine how program changes may affect course requirements. We recommend that you bring a copy of your previous curriculum worksheet and a transcript.

Transfer Students and Advanced Standing Credits

If you are transferring from a community college, junior college, technical institute, or other college or university, you may transfer applicable credits toward the degree requirements of a program in the School of Engineering Technology.

If you are admitted with transfer or advanced standing credits from another institution, you must meet the requirements for admission as set forth under the regulations stated. (See "Degree Candidates," page 57.) Advanced standing in the School of Engineering Technology may be obtained by transfer of credits, proficiency examination, or by completing the College Level Examination Program (CLEP).

Transfer of Credits

You may receive, subject to the approval of the Academic Standing Committee, credits for academic work completed in other approved schools, colleges, or universities if the following criteria are met: the content of the course being submitted is equivalent to that of the corresponding School of Engineering Technology course; the grade achieved in the course submitted is C or higher; and the remoteness of the time of study does not negate its use as a prerequisite for an advanced course.

If you desire advanced standing credits by transfer, you must file a petition for transfer credit. You should ask the registrar of the institutions previously attended to mail an official transcript to the School of Engineering Technology, 120 Snell Engineering Center, Boston, Massachusetts 02115.

Proficiency Examinations

If you are a degree candidate in good academic standing and you do not meet all the criteria for the normal transfer of credits but are able to supply evidence of sufficient knowledge of a technical subject, you may petition for a proficiency examination. Knowledge can be demonstrated through job experience or by completing noncredit continuing education courses such as those offered by Northeastern's Building Design and Construction or State-of-the-Art programs. After paying the proficiency examination fee and demonstrating proficiency as indicated by the examination, you will receive advanced standing credit.

College Level Examination Program

The School of Engineering Technology awards college credit under the College Level Examination Program (CLEP). This program is designed to enable individuals who have reached college-level education to demonstrate their achievement through testing and to receive college credit applicable toward a degree program. (The examination measures basic proficiency in the arts and sciences.) After paying the exam fee and receiving a passing score, you will be awarded advanced standing credit. For further information, contact the School of Engineering Technology, 617-437-2500.

Registration

Selecting Courses During Registration

Courses offered by the School of Engineering Technology are listed in the "Course Descriptions" section of this *Bulletin*. (See page 32.) Part of each course's entry lists in which quarters the course is offered. Because most courses are not offered every quarter, you should plan your course load for the entire academic year, not just the next quarter. Academic counseling is available to help plan your course load for the year. If you need help, contact a School of Engineering Technology program counselor at 617-437-2500.

Guidelines for Registering for Electives

Many of the School of Engineering Technology's degree programs require the completion of electives. The electives give you the chance to explore topics beyond the core curriculum's scope or to gain expertise in a specific area introduced by the core courses.

There are three categories of electives: open, technical, and social science/humanities.

Open Electives

Any course is acceptable as an open elective except physical education, military science, and preparatory courses. An open elective may be either a three or a four quarter-hour course.

Social Science/Humanities Electives

Social science/humanities electives are offered through University College and must be chosen from a list that is available from the School of Engineering Technology. Six quarter hours of the social science/humanities electives must be chosen from the speech communications (SPC) category.

Technical Electives

Technical electives must be chosen from the list of suggested technical electives appearing at the end of the degree curricula. Students wishing to take an upper-level course that does not appear on the list must petition for permission before attending the class. Students should submit a proposed program of elective courses for approval by the program coordinator. Electives preferably represent a minor field of concentration consistent with personal career objectives.

Registration Periods

Official registration periods are scheduled for each quarter during the academic year. We strongly recommend that you register for courses during these periods. The registration dates, times, and locations are listed in the enclosed Fee Schedule and Academic Calendar.

Before the registration period begins, get a copy of the *University College and School of Engineering Technology Schedule* for the next quarter. The *Schedule* provides you with the meeting times and locations of the courses being offered during the next quarter. To get a copy of the *Schedule*, contact the School of Engineering Technology at 617-437-2500.

Changes in Registration

You can change the courses you are registered in by filing a course drop form at the registrar's office, 120 Hayden Hall, and then registering for the desired course. We suggest that you make these changes during the official registration period, if possible.

Cross-Registration

Basic College students registering for School of Engineering Technology part-time courses may do so only to clear deficiencies or to follow a program approved by the appropriate program coordinator. Basic College students may register for part-time courses only by completing the registration form available in the School of Engineering Technology office by the end of the first week of the quarter. You must *not* fill out any other part-time registration materials. Approval of the program coordinator must be obtained if the course does not appear on your approved program sheet. Approval from the Department of Cooperative Education is required if you take more than one course during a co-op term. Upon completion, approval, and submission of the registration form, you will be registered automatically for the course. If the course is a substitute for a day course, the latest grade received is considered for quality-point calculations. If you do not appear on the part-time roster you will not be admitted into the class unless you have an approved registration form. In all instances, Basic College students must adhere to the

academic and administrative requirements of the School of Engineering Technology part-time course.

Part-time School of Engineering Technology students who have been enrolled at Northeastern University for one or more quarters are eligible to register for a limited number of Basic College day courses. This policy is designed to accommodate previous School of Engineering Technology students who have experienced employment changes that make it impossible for them to continue part-time studies. If you are eligible, you may register for eight quarter hours of day course credit per quarter for a maximum of three academic quarters. Since you will be a part-time evening student in Basic College courses, tuition, fees, student services, and space availability will be based on part-time rates and departmental policy. If you are interested, you must first determine if a specific course is offered in the University, complete the registration form in the School of Engineering Technology, and have the form approved in both the bursar's and registrar's offices. At this point the academic department will determine space availability.

Academic Standards

Campus Locations

All courses are offered at the main campus in Boston, with some courses available at the Suburban Campus, Burlington; Burlington High School; the Dedham Campus; and Marlboro High School. Refer to the "Campus Maps" section. (See page 81.)

Quarter Calendar

Northeastern University operates on a quarter-system calendar. All courses are evaluated in terms of quarter-hour credit. A quarter-hour credit is equal to three-fourths of a semester-hour credit.

Class Session

Classes at Northeastern are scheduled in different modules. In assessing quarter-hour weight for courses, the following statement applies: One quarter hour of credit is equal to approximately fifty minutes of instruction per week, plus two hours of individual study.

Coursework

Various methods of instruction will be used in the course of your studies: lectures, home assignments, class projects, laboratory work, irregularly scheduled quizzes, and formal examinations. In addition, you will complete midterm examinations in most courses and a final examination at the completion of all courses. You are responsible for fulfilling all the requirements of a course. In the event of absence, you must make appropriate arrangements for makeup with the instructor.

Attendance

Chronic absence from regularly scheduled sessions in any subject, for whatever reason, may seriously jeopardize your academic progress and status. You are expected to attend all sessions scheduled in your courses. Excessive absence during a quarter may be sufficient cause for the registrar to remove the course(s) from your schedule.

Withdrawal

Students who wish to withdraw from a course must complete a Course Drop Form, available from the registrar representative at any campus location. Ceasing to attend classes or notifying the instructor does not constitute official withdrawal from a course. Students who withdraw from a course prior to the end of the seventh week of a term (please refer to the specific deadline in each *Schedule Guide*) will have no record of the withdrawal on their transcripts. Students may withdraw from the beginning of the eighth week to the end of the week prior to final examinations but the withdrawal will be noted on their transcripts. No withdrawals will be allowed for any reason during the week that final examinations are given.

In addition, the registrar will withdraw you from a course if you do not attend the first three classes at the beginning of the quarter or the first two classes at the beginning of a summer term.

Grading Systems

You are required to maintain appropriate grades, quality-point average, and the quantitative credit requirements of your program to satisfy academic progress criteria and graduate from the School of Engineering Technology.

The following grading system is used. The numerical equivalent for each grade is in parentheses.

A	(4.000)	Outstanding Attainment
A –	(3.667)	
B +	(3.333)	
B	(3.000)	Good Attainment
B –	(2.667)	
C +	(2.333)	
C	(2.000)	Satisfactory Attainment
C –	(1.667)	
D +	(1.333)	
D	(1.000)	Poor Attainment
D –	(0.667)	
F	(0.000)	Failure
I	–	Incomplete
L	–	Audit (No Credit)
S	–	Satisfactory achievement in a pass-fail course; counts toward total degree requirements
U	–	Unsatisfactory achievement in a pass-fail course
X	–	Incomplete in a pass-fail course
*	–	Grade not received

A general average of D is unacceptable and will not allow you to continue in the School of Engineering Technology or to receive a degree from Northeastern University. If you receive an F, you can clear the failure by repeating and passing the course.

Pass/Fail Courses

If you are a *degree candidate* in good academic standing and have completed forty quarter hours in a School of Engineering Technology degree program, you may register for one pass/fail course. Thereafter, you may register for one course on a pass/fail basis for each ten quarter hours of successfully completed work up to a maximum of nine quarter hours of pass/fail credit. You must obtain written permission from the appropriate academic dean or designee and approval of the instructor. You may not register for more than one pass/fail course per quarter. Pass/fail courses are restricted to social science/humanities electives only.

If you are a *nondegree candidate*, do not intend to become a degree candidate, and are making good academic progress, you may register for a course on a pass/fail basis with written permission from the appropriate academic dean or designee and approval of the instructor. You may not register for more than one pass/fail course per quarter.

If you become a degree candidate, you may use only nine quarter hours of social science/humanities elective credit, where applicable.

Auditing a Course

You can audit courses by filing the usual registration forms and paying the regular tuition fees. There is no reduction in fees for auditing. Your decision to audit must be communicated in writing to the registrar prior to the fourth class meeting. As an auditor, you may participate in class discussion, complete papers and projects, and take tests and examinations for informal evaluation if desired. However, regardless of the amount or quality of work completed, *no academic credit will be granted at any time for courses audited.*

Makeup Examinations

Midterms

If you are absent from a midterm examination, you may petition for a makeup examination; you do not automatically have the right to make up a missed examination. You must file a petition for a missed midterm in accordance with the published schedule. Petitions may be obtained from the School of Engineering Technology office, 120 Snell Engineering Center, 617-437-2500.

If the petition is granted, you will be notified when and where to make up the examination. All examinations are administered on the Boston campus. If you do not take makeup midterm examinations as scheduled you will forfeit the privilege. *There is no fee for a midterm makeup.*

Finals

If you are absent from a final examination, you will receive a grade of I (Incomplete) for the course. You do not automatically have the right to make up a missed final examination; you must file a petition for a missed final according to the published schedule. Petitions may be obtained from the School of Engineering Technology office, 120 Snell Engineering Center, 617-437-2500. If the petition is granted, *you must pay a fee before taking the special examination.* (See enclosed Fee Schedule and Academic Calendar.)

You will be notified when and where to take the final examination; all are administered on the Boston campus. If you do not take makeup final examinations as scheduled, you will forfeit the makeup privilege.

Quality-Point Average

The quality-points you earn in a given course are determined on the basis of your letter grade and the credit hours carried by the course. The total quality-points earned, divided by the total number of credit hours, constitutes the quality-point average.

- 1. When you receive more than one grade in the same course, the most recent grade will be used to calculate a quality-point average.
- 2. A grade of I (Incomplete) will not be considered in the final calculation.
- 3. If you are a transfer student, you can receive advanced standing credits (ASC) for work completed at other institutions. While these credits count toward completion of credit requirements, neither the credits nor the grades earned in such courses are included in quality-point averages.
- 4. In programs made up of combined University College and School of Engineering Technology courses, your cumulative quality-point average will include all work in both colleges.

For example, if you have registered for thirteen courses, cleared a failure in one of them, cleared an incomplete in another by repeating the course, and received advanced standing credit in another, you may calculate the quality-point average as follows.

Grade Achieved	Numerical Equivalent	×	Credit Hours	=	Quality Points
A	4.000	×	4	=	16.000
A –	3.667	×	3	=	11.001
B +	3.333	×	3	=	9.999
B	3.000	×	4	=	12.000
B –	2.667	×	2	=	5.334
C +	2.333	×	2	=	4.666
C	2.000	×	4	=	8.000
C –	1.667	×	3	=	5.001
D +	1.333	×	2	=	2.666
D	1.000	×	3	=	3.000
D –	0.667	×	2	=	1.334
F	0.000	×	2	=	0.000
FB	3.000	×	3	=	9.000
I	–	×	–	=	–
IC	2.000	×	2	=	4.000
ASC	–	×	–	=	–
Totals				39	92.001

QPA = $\frac{\text{Total Quality Points (92.001)}}{\text{Total Credit Hours (39)}} = 2.359$

The registrar cannot confirm calculations of quality-point averages. Each student’s record is updated before graduation. In the meantime, borderline cases can be checked by a School of Engineering Technology counselor.

Grade Reports

The registrar’s office will mail you a grade report that indicates both the quarterly quality-point average and the cumulative quality-point average. University regulations prohibit issuing grades by telephone.

Academic Progress Criteria

You are expected at all times to strive for a high record of achievement. The Academic Standing Committee reserves the right to review all students’ records and deny readmission to those who fall below a minimum quality level of achievement. This requirement has been established as follows.

In order to remain in the college, you must have a quality-point average of at least: 1.40 at the completion of twenty-four quarter hours; 1.50 at the end of forty-eight quarter hours; and 1.60 at the end of seventy-two quarter hours.

If you accumulate the equivalent of six uncleared failures, you may be considered ineligible to continue your program of study.

Scholastic Probation

The Academic Standing Committee has the authority to dismiss from the school or to place on scholastic probation any student whose scholarship is deficient because of a low quality-point average or excessive outstanding failures, regardless of quality-point average.

A student on scholastic probation should be particularly diligent in current course work and make every effort to clear the academic deficiencies as soon as possible. Students whose academic records do not improve or whose failures are not properly cleared may not be allowed to register for further courses.

A student on scholastic probation who has cleared all or a substantial part of any outstanding failures may petition the Academic Standing Committee for removal from the probation list.

Disciplinary Probation

The Academic Standing Committee has the authority to dismiss from the school or place on disciplinary probation any student who is deemed unworthy because of conduct or character. The committee may ask any student to withdraw from the school who is obviously out of sympathy with its aims and ideals.

Graduation Requirements

To receive the degree of associate in engineering, associate in science, or bachelor of science in engineering technology, you must meet the following requirements.

- 1. Formal acceptance into degree candidate status by the Committee on Admissions.
- 2. Completion of all curriculum courses, either by attendance at the School of Engineering Technology or by receiving advanced standing credit.
- 3. Completion of associate degree programs within eight years and bachelor's programs within twelve years from the date of entrance into the School of Engineering Technology (extensions of time may be granted by the Academic Standing Committee).
- 4. Attendance for at least a year preceding the expected graduation date, and completion of at least one-fourth of the work in the School of Engineering Technology.
- 5. Maintenance of a minimum quality-point average of 2.00 in all courses in the major and a minimum overall quality-point average of 2.00.
- 6. Completion of additional credit amounting to at least one-fourth of the total hours required to be awarded more than one associate or bachelor degree.
- 7. You must petition for transfer of credits completed at other institutions prior to January 1 of the year in which you are to receive the degree.

Academic and Professional Awards

The academic programs offered by the School of Engineering Technology and the teaching, counseling, and professional efforts of the faculty and staff are aimed at motivating you

toward the highest levels of academic achievement. To encourage scholarly and professional excellence and to recognize quality achievements, the following awards are made at appropriate times during the academic year.

Dean's List Scholars

All matriculated students maintaining honor grade averages—a minimum quality-point average of 3.00 and no grades below C during a quarter, while carrying a minimum of eight quarter hours of credit—are recognized as Dean's List Scholars. If you want a certificate attesting to this honor, contact the School of Engineering Technology office.

Graduation with Honor

Bachelor's degree candidates who have superior achievement will be graduated with honor, high honor, or with highest honor, depending on the final quality-point average as follows.

Graduation with honor	3.25–3.49
Graduation with high honor	3.50–3.74
Graduation with highest honor	3.75–4.00

To be considered for graduation with honor, a student must have completed a minimum of 72 quarter hours of work at the School of Engineering Technology. Courses transferred from other educational institutions will not be considered in determining honor graduates.

Awards

University Awards

The University Awards are presented annually to seniors who have achieved high-ranking cumulative academic records. Certificates are awarded at the annual Class Day Ceremony.

Technology Awards

The Technology Awards are presented annually to seniors who have demonstrated superior academic and professional capabilities in their fields. Appropriate certificates are distributed to outstanding students enrolled in the following program categories.

- Aerospace Maintenance Engineering Technology
- Computer Technology
- Electrical Engineering Technology
- Mechanical Engineering Technology
- Mechanical-Structural Engineering Technology

Class Marshal Award

The Class Marshal Award is presented annually at the Class Day Ceremony to the top-ranking senior in a baccalaureate program. The award consists of a certificate and the President's Letter of Commendation.

Sigma Epsilon Rho Awards

This award is presented annually by Sigma Epsilon Rho, the evening colleges' scholastic honor fraternity. The highest-ranking students in University College and the School of Engineering Technology receive certificates and pins for outstanding scholastic achievement.

Tau Alpha Pi Awards

This award is presented annually by the Tau Alpha Pi National Engineering Technology Honor Society to recognize high scholastic achievement among students of the School of Engineering Technology. The award is intended to promote and encourage outstanding academic performance by offering membership in the society. Finally, the society hopes the award will strengthen the desirable qualities of personality, intellect, and character among its members. Inductees receive certificates and pins.

Alumni Award for Professional Promise

Established in 1947 by the Northeastern University Alumni Association, the Alumni Award for Professional Promise is presented annually at the Class Day Ceremony. The award is made to the senior who has demonstrated unusual professional promise through character traits, scholastic achievement, and professional performance.

Additional Opportunities at Northeastern

Educational Opportunities at Northeastern for Associate's Degree Graduates

Graduates of associate's degree programs in engineering technology or science technology programs may be able to transfer applicable credits toward the degree requirements of a baccalaureate program in engineering technology or operations technology at Northeastern.

For information about transferring associate's degree credits toward an engineering technology bachelor's degree, call the School of Engineering Technology, 617-437-2500. For information about transferring associate's degree credits toward an operations technology bachelor's degree, call University College, 617-437-2400.

In addition, engineering technology or science associate's degree graduates who maintained a quality-point average (QPA) of 2.75 may be able to transfer applicable credits toward a bachelor of science in engineering degree. For information, call the College of Engineering's student services office, 617-437-2154.

Educational Opportunities at Northeastern for Bachelor's Degree Graduates

Bachelor of science in engineering technology graduates who maintained a quality-point average (QPA) of 2.75 may be qualified to enter the College of Engineering's program leading to the bachelor of science in engineering degree. For information, call the College of Engineering's student services office, 617-437-2154.

Financial Information

Tuition and Fees

This section contains a brief description of the fees and charges that the University assesses for instruction or other services. The actual fee amounts are listed in the enclosed Fee Schedule and Academic Calendar. If you do not have a Fee Schedule and Academic Calendar, you can request one by calling 617-437-2500.

Tuition rates, all fees, rules and regulations, courses, and course content are subject to revision by the President and the Board of Trustees at any time.

Registration and Tuition Fees

As a new student, you will be charged a one-time, nonrefundable registration fee. This fee is included in your tuition bill.

Students are permitted to audit courses, but there is no reduction in fees for auditing.

You may not attend class sessions or take any examination until you have paid your tuition or have made satisfactory arrangements for payment.

You will not be advanced in class standing, nor permitted to re-enroll in the University, nor have degrees conferred until all financial obligations to the University have been met.

If you are assigned to courses in other departments or colleges of the University, you will be charged tuition and other fees effective in those departments.

Deferred Payment Privilege

Occasionally situations develop, usually beyond the control of the student, that make it difficult to make regular payments. Under such circumstances, we recommend that you discuss the problem personally with the Office of the Bursar, where you can work out a convenient deferred payment agreement. A service fee is charged for this privilege. (See enclosed Fee Schedule and Academic Calendar.)

Late Payment Fee

A late payment fee is assessed on all accounts for failure to make payment or arrange for deferred payment by the bill due date.

Refund of Tuition

The general tuition refund policy in all schools and colleges of the University is as follows. The University provides instruction on a quarterly basis for which you must pay at the beginning of each quarter. Tuition refunds are granted for official withdrawal from a course through the first four weeks of a quarter.

Tuition refunds are granted only on the basis of the date appearing on the official withdrawal application filed with the registrar, 120 Hayden Hall. *Nonattendance does not constitute official withdrawal.* Requests for refunds must be made through the Office of the Bursar, 245 Richards Hall.

Refunds will be granted in accordance with the following schedule.

<i>Official withdrawal filed within</i>	<i>Percentage of tuition</i>
1st week of quarter	100%
2nd week of quarter	75%
3rd week of quarter	50%
4th week of quarter	25%
5th week or later	0%

Tuition Underwritten by Employers

If tuition is being paid directly by your employer to the University, you should give the Office of the Bursar a purchase order or a statement from an officer of the company, certifying that the company is underwriting the tuition.

Many companies, however, do not pay the University directly but will reimburse employees upon successful completion of each course. In such cases, you are responsible for payment in full at the start of each quarter.

You may choose to pay in installments on the deferred payment plan. However, tuition may not be left unpaid pending employer reimbursement.

Failure to make payments in accordance with these regulations will result in a late payment fee.

If you have any questions about student accounts, please direct them to the student account bursar, 245 Richards Hall, 617-437-2270.

Student Center Fee

If you attend the main Boston campus in the evening in a part-time program of study, you will be assessed a nominal student center fee.

Parking Registration Decal Fee

If you park in the Boston or Burlington campus lots, you must obtain a parking registration decal by the beginning of the second week of the quarter. You may pay the fee at the cashier's office, 248 Richards Hall, or at the Burlington campus cashier's office.

Medical Insurance

The Commonwealth of Massachusetts requires all Northeastern University students who are classified as full-time or enrolled in a degree program carrying nine or more credits to be covered by medical insurance. In compliance with the law, Northeastern University will automatically enroll you in its Blue Cross/Blue Shield plan and bill your student account for this coverage. The law allows you to waive the University's plan if you are covered by comparable medical insurance. Medical insurance waiver forms are available at the bursar's office, 245 Richards Hall.

Proficiency Examination Fee

Applicants may petition for advanced standing credit based on a "proficiency examination." There is a fee for each examination requested.

Transcript Fee

You can obtain a transcript at the registrar's office, 117 Hayden Hall. There is no charge for an unofficial transcript. The official transcript fee is payable in advance at the cashier's office, 248 Richards Hall. You must present a current picture identification card to obtain your transcript.

Textbooks and Supplies

You must purchase your own textbooks and work materials. The cost varies according to the subject. If you are enrolled in Engineering Graphics, you should be prepared to purchase drawing supplies and a set of drawing instruments, in addition to the textbooks.

Financial Aid and Scholarships

The Office of Financial Aid, located at 356 Richards Hall, offers several types of assistance to part-time students. All awards are based on financial need. Aid granted from programs sponsored by the federal or state government is dependent upon the amount of funding allocated to Northeastern University. Federal regulations require that students who receive financial aid funds be United States citizens or permanent residents.

Application Procedure

All students applying for aid must submit a Financial Aid Form (FAF) to the College Scholarship Service. The College Scholarship Service is an agency that collects financial data from students and distributes the data to schools, state agencies, and the Pell Grant program.

Federal regulations require that students submit a Financial Aid Transcript (FAT) from each school they have previously attended to the Office of Financial Aid before they can receive financial aid at Northeastern. This is required even if you did not receive aid at the other institution(s). If your transcript indicates you are in default on a loan or you owe a refund, you will be ineligible for all types of financial aid until this status is cleared.

Northeastern University also requires its students to complete an Institutional Application. This form gathers information that assists the office in determining a student's eligibility for aid.

All application materials are available at the Office of Financial Aid. Students should begin the application procedure at least twelve weeks

before the start of the quarter in which they plan to enroll. Students must apply for financial aid each academic year.

In order to be eligible for financial aid, students must be admitted into a degree program prior to the beginning of the academic quarter. Students admitted after the start of the quarter will not be eligible for aid until the next academic quarter.

First-year students must submit a Letter of Provisional Matriculation from the School of Engineering Technology. A Letter of Provisional Matriculation is valid for one year. At the conclusion of the year, students must be officially admitted into a degree program in order to retain eligibility for aid.

Satisfactory Academic Progress

For all students who are receiving financial aid for the first time on or after July 1, 1987, satisfactory academic progress will be determined based on having achieved a 2.0 QPA after the completion of the second grade level and maintaining that minimum until completion of the degree. Students not achieving a 2.0 QPA or dropping below that minimum after their second grade level will not, by Federal law, be eligible for financial aid.

Financial Aid Programs

Financial aid to students is offered in the form of loans and grants. Available programs follow.

Pell Grant

Based on a student's financial information, a student may be eligible for a Pell Grant. The Pell Grant Program is a federal aid program designed to provide financial assistance to undergraduate degree candidates. Approximately six weeks after a student has filed the FAF, the Pell Grant Processor will send the student a Student Aid Report (SAR). If a student is eligible for a Pell Grant, the SAR must be submitted to the Office of Financial Aid.

This program requires a student to be admitted into a degree program and be enrolled in at least six quarter hours per quarter. If eligible for a Pell Grant, the amount of the grant will vary depending upon the number of quarter hours a student enrolls in each quarter. If a student's enrollment is less than six quarter hours during a quarter, the Pell Grant will be cancelled for that quarter. Students with a prior bachelor's degree are not eligible to receive Pell Grants.

State Scholarships

Full-time students are advised to complete a state-specific FAF by the published deadline. Eligibility for state scholarships is based on need and is determined by the scholarship office in each state. Students will receive a letter from the state scholarship office notifying them of their eligibility. In order to be eligible for a state scholarship, a student must be admitted into a degree program and enrolled in at least twelve quarter hours per quarter. A student with a prior bachelor's degree is not eligible to receive a state scholarship. Contact your state scholarship office for more information.

Stafford Student Loan Program

The Stafford Student Loan Program enables a student to borrow a maximum of \$2,625 per academic year during the freshman and sophomore years (first and second grade levels) and up to \$4,000 per academic year for subsequent grade levels from a participating bank or other financial institution. The federal government pays the interest while the student is in school. This loan must be repaid. The legal maximum loan limit for undergraduate students is \$17,250.

Eligibility to participate in the Stafford Student Loan Program is based on need in accordance with federal regulations. Students must be admitted into a degree program and enrolled on at least a half-time (six quarter hours per quarter) basis in order to be considered for this loan.

In order to have a loan processed by the financial aid office, a student must have a complete financial aid application on file, have received a letter of eligibility from Northeastern, and have submitted a Stafford Student Loan Application. Applications for the loan are available from local lending institutions and the Office of Financial Aid.

Repayment of the loan usually begins six months after a student withdraws, graduates from an educational institution, or ceases to carry at least a half-time course load. The repayment period may be as long as ten years. The amount of the payments depends upon the size of the debt, but must be at least \$50 per month.

Repayment on loans may be deferred under certain circumstances. For details, contact your lender.

Students who borrow funds through this program must report any of the following changes to their lenders:

- withdrawal from school
- transfer to another school
- reduction of course load to less than half-time
- change of address or parents' address
- change of name

Additional information about financial aid is available from the Office of Financial Aid, 356 Richards Hall, 617-437-3190.

All federal financial aid programs are subject to change depending on adequate and continuing federal support.

Community Sources

Students and their families are urged to explore community, industrial, and foundation sources for collegiate financial aid. Parents' employers or the appropriate union organization may be a source. In addition, local, civic, political, religious, or educational leaders are often aware of aid sources in the immediate community. Some typical sources include PTA, Kiwanis, Lions, Elks, Knights of Columbus, Masons, Sons of Italy, Rotary, State Rehabilitation, or the American Legion.

Veterans' Benefits

Veterans covered by the Veterans Readjustment Act of 1966, Public Law 89-358, should report to 120 Hayden Hall to fill out the proper enrollment forms. Benefits depend on course load and increase sharply when a student takes more than eight quarter hours per quarter.

Students needing additional information about eligibility, allowances, or other details are urged to contact the local office of the Veterans Administration or the Veterans' Benefits Representative at 120 Hayden Hall, 617-437-3388.

Scholarships and Application Procedures

The School of Engineering Technology and University College scholarships and awards that follow are available to students who have been accepted as degree candidates and are in good academic standing.

Scholarships are awarded once a year by the Scholarship Committee. Final selection of scholarship recipients is usually made in late May, followed by the awarding of the scholarships in late June or early July. Funds are usually applied to tuition expenses for the following academic year. Awards range in amount from \$250 to \$700.

In January, a mailing list of students who have requested applications is prepared, and applications are mailed out with the stipulation that they be completed and returned to the Scholarship Committee's director's office by March 31. To be placed on the January mailing list, call 617-437-2400 and leave your name, address, and student ID number.

Leslie B. Cutler Aviation Scholarship Awards

Established by the members of the Aero Club of New England in recognition of the late Senator Cutler's service and devotion to the interests of aviation, these awards are made to students who most typify the same interest, devotion, and leadership demonstrated by Senator Cutler during her long and distinguished public career.

Henry J. Doherty Memorial Scholarship Fund

Established in 1987 through the generosity of Doris R. Doherty as a tribute to her late husband, a 1953 graduate of the School of Business' evening program and a successful business leader in legal publishing. The income from the scholarship is awarded annually to deserving students with demonstrated financial need who are pursuing part-time evening study and have been accepted as degree candidates.

Kappa Tau Phi Scholarships

Granted annually to those women students in the arts and sciences, business, and engineering programs who rank highest at the end of the upper-middle year. If the chosen student is eligible for an award of greater monetary value, the award will be made to the next highest-ranking woman student. To be eligible for this scholarship, the student must be enrolled in a program of at least two evenings per week and must be a candidate for the bachelor's degree. In determining the recipient, grades of all courses completed in prior years shall be considered.

Robert G. Keene Memorial Scholarship Fund

Established in 1979 in memory of Robert G. Keene, a graduate of Lincoln College (now the School of Engineering Technology), Class of 1972, the endowment funds were provided by the friends and associates of Robert G. Keene and the Polaroid Corporation, where he served as an engineering manager. The income from the fund is awarded annually to an undergraduate in any college of the University who demonstrates financial need as well as strong character and initiative. Primary consideration will be given to children of Polaroid employees.

Martin Luther King, Jr., Scholarships

Established in 1969 in memory of the late Rev. Martin Luther King, Jr., awards are made, as openings occur, to minority-group adults who would otherwise be unable to continue their education. Stipends will cover tuition expenses not to exceed six quarter hours in any academic quarter (excluding the summer quarter).

William J. McGovern Memorial Scholarship

Established in 1978 by an anonymous donor who wishes to assist others in realizing their potential through higher education and to honor the memory of William J. McGovern. The income from this scholarship will benefit worthy undergraduate students actively pursuing studies in the School of Engineering Technology or University College. Recipients must be matriculated, demonstrate financial need and academic achievement, and exhibit a high level of professional promise.

Sigma Epsilon Rho Honor Society Scholarship Award

Established in 1974 by the membership of the society. Income from the fund is awarded annually to undergraduate student(s) of the School of Engineering Technology and/or University College at Northeastern University. Eligible students must have a cumulative quality-point average of 3.00 or better after completing 75 percent or more of the required studies.

H. Patricia Taylor Scholarship Fund

Established in 1974 by H. Patricia Taylor, a graduate of University College, and her husband, Harry C. Taylor, a graduate of the School of Business, the scholarship expresses their appreciation for financial assistance made available to Mrs. Taylor while obtaining her degree, and is an attempt to provide similar funds to assist others in realizing potential through higher education. The income from the scholarship fund will be awarded annually to a student enrolled in University College or the School of Engineering Technology who demonstrates financial need and academic stability and who meets certain other conditions of eligibility.

University College and the School of Engineering Technology Faculty Society Memorial Scholarship Awards

The Faculty Society of University College and the School of Engineering Technology offer two awards annually, primarily for excellence in studies, to bachelor's degree candidates in University College and the School of Engineering Technology who have carried and are currently carrying a minimum of twenty-four quarter hours annually. Applications, available during the winter quarter, must be returned before the spring quarter. These awards are given in commemoration of the Faculty Society's deceased members.

Mark Caldwell Whitney Memorial Aviation Scholarship Fund

Established in 1981 by the family and friends of the late Mark Caldwell Whitney, an outstanding 1973 graduate of the Aeronautical Technology Program. Income from the fund is awarded annually to a student with financial need who exemplifies Mr. Whitney's love of flying and commitment to excellence in the aviation field.

Appendix



Faculty

A listing of the School of Engineering Technology's faculty follows.

David J. Allen, MSCE

Assistant Professor
Computer Technology

Robert B. Angus, Jr., MS

Lecturer
Electrical Engineering Technology

David S. Goldman, MS, PE (CA, MA, NH)

Associate Professor
Computer Technology

John E. Hajjar, PhD

Assistant Professor
Computer Technology

Eric W. Hansberry, MS

Assistant Professor
Design Graphics

George F. Kent, MS, MBA, PE (CT, MA)

Visiting Associate Professor
Mechanical Engineering Technology

Nonna K. Lehmkuhl, MEd, MS

Program Coordinator and Associate Professor
Computer Technology

Frederick J. Nohmer, EdD

Assistant Professor
Electrical Engineering Technology

Ronald E. Scott, ScD

Lecturer
Electrical Engineering Technology

A listing of the School of Engineering Technology's part-time faculty follows. Each entry gives the faculty member's name; highest degree earned; professional affiliation; and University title, department, and year of appointment.

Arnold W. Almquist, MEd

Mathematics Instructor, Needham High School
Senior Lecturer, Mathematics (1967)

Francis M. Antczak, BSEE

Senior Engineer, Mass. Electric Co.
Lecturer, Electrical Engineering Technology (1985)

Henry G. Barry, MEd

Retired
Senior Lecturer, Mathematics (1979)

Matteo P. Berardi, MS, PE

Consultant
Senior Lecturer, Mechanical Engineering Technology (1960)

Maureen P. Berggren, MEd

Mathematics Teacher, Quincy High School
Senior Lecturer, Mathematics (1965)

Wayne M. Bethoney, BS

Mechanical Engineer, AMMRC
Lecturer, Mechanical Engineering Technology (1982)

Robert E. Bobeck, MEd

Senior Lecturer, Bristol Community College
Senior Lecturer, Engineering Graphics (1976)

Edward Bobroff, BSME

Test and Start-up Manager, Cogeneration
Management/Harvard University
Senior Lecturer, Mathematics (1946)

Azzouz Boulenuar, MSEE

PhD Student, Northeastern University
Lecturer, Computer Technology (1987)

Donald C. Brock, MS

Mathematics Instructor, Needham High School
Senior Lecturer, Mathematics (1965)

Kip A. Brown, BS

Programmer/Analyst, United States Department
of Transportation
Lecturer, Computer Technology (1982)

Thomas J. Bugos, PhD

Software Engineer, Prime Computer, Inc.
Lecturer, Computer Technology, (1985)

Vincent K. Butler, MS

Senior Systems Specialist, New England
Telephone (NYNEX)
Lecturer, Computer Technology (1982)

Joseph M. Cardito, PhD, PE, CHP (American Board of Health Physics)
 Supervisor, Nuclear Fuels and Data Systems,
 Stone & Webster Engineering Corp.
Lecturer, Mechanical Engineering Technology (1978)

Robert W. Case, PhD
 Coordinator for Day Mathematics, School of
 Engineering Technology
Senior Lecturer, Mathematics (1976)

Walter J. Casey, MEd, MAT
 Senior Lecturer, Brighton High School
Senior Lecturer, Mathematics (1955)

Joan M. Chrusciel, MEd, MA
 Mathematics Department Head, Quincy High School
Lecturer, Mathematics (1980)

Wendell R. Collymore
 Certification Engineer, Polaroid Corp.
Senior Lecturer, Engineering Graphics (1976)

Richard J. Colvario, MEd
 Project Leader, Massachusetts Department
 of Revenue
Lecturer, Computer Technology (1987)

Thomas R. Connolly, BET
 Controls and Instruments Engineer,
 General Electric Co.
Lecturer, Electrical Engineering Technology (1985)

Roger T. Connor, MEd
 Mathematics Teacher, Milton Academy
*Senior Lecturer and Course Consultant, Calculus and
 Differential Equations (1953)*

Robert J. Cormier, BS, Registered Landscape Architect (CT, MA, NY, RI)
 Site Planner and Land Architect, Self Employed
*Lecturer, Architectural Engineering
 Technology (1984)*

James B. Corscadden, MEd, AMT
 Principal, Ellis Mendell School
Senior Lecturer, Mathematics (1967)

William L. Crenshaw, MSME, PE
 Mechanical Engineer, US Army Materials and
 Mechanics Research Center
*Senior Lecturer, Mechanical Engineering
 Technology (1978)*

David C. Crockett, MSME
 Senior Engineer, Raytheon Equipment Division
*Senior Lecturer, Mechanical Engineering
 Technology (1969)*

Gregory Czarnowski, MEd
 Marketing and Advertising Consultant
Lecturer, Technical Communications (1982)

Thomas R. Deveney, MA
 Principal, Thomas J. Kenney School
Senior Lecturer, Mathematics (1965)

Jane E. DeVoe, MA
 Lecturer in Mathematics, Northeastern University
Lecturer, Mathematics (1980)

Douglas H. Diamond, BSEE
 Program Manager, Analytical Systems
 Engineering Corp.
Senior Lecturer, Mathematics (1968)

Raffaele Di Cecca, MA, MS
 Assistant Professor, Wentworth Institute
 of Technology
Lecturer, Mathematics (1982)

Giles C. Dilg, MSEE, PE
 President, Giles Dilg Co.
Senior Lecturer, Computer Technology (1966)

Mark Domaszewicz, MSEE
 Senior Engineer, Raytheon Co.
Senior Lecturer, Mathematics (1970)

Leonard F. Dow, MS, PE
 Staff Engineer, Boston Edison Co.
*Senior Lecturer, Electrical Engineering Technology
 and Course Consultant, Circuit Analysis and
 Circuit Analysis Laboratories (1970)*

William Dubie, BA, BS
 Communications Specialist, Digital
 Equipment Corporation
Lecturer, Technical Communications (1986)

David P. Durant, MEd, MS
 Teacher, Boston Latin School
Lecturer, Mathematics (1983)

Henry B. Eden, BA
 Vice-President, Tech-Graphics
Senior Lecturer, Engineering Graphics (1957)

Peter A. Eggleston, MS
 Senior AI Systems Engineer, Textron Defense
 Systems
Associate Lecturer, Computer Technology (1987)

Essam Elkordi, PhD
 Teaching Assistant, Northeastern University
*Associate Lecturer, Structural Engineering
 Technology, (1992)*

Walter E. Engstrom, MS
 Physics Instructor, Braintree High School
Lecturer, Physics (1985)

Adolf J. Erikson, MBA, PE (MA)
 President, A.E. Engineering Corp.
Senior Lecturer, Engineering Graphics (1966)

Gordon C. Estabrooks, MA, MEd, MNS, CAGS

Science Teacher, Boston Latin School

*Lecturer, Physics (1983)***Andreas L. Evriviades, MA**

Teacher of Mathematics, Milton Academy

*Lecturer, Mathematics (1983)***Thomas C. Fantasia, MSEE**

Power Coordinator, Boston Edison Co.

*Lecturer, Electrical Engineering Technology (1981)***Edwin H. Farr, PhD**

Mathematician, RJO Systems Engineering

*Lecturer, Mathematics (1980)***William D. Finan, DEd**

Retired

*Senior Lecturer, Mathematics (1946)***John M. Flaherty, PhD**

President, Flaherty Research

*Senior Lecturer, Electrical Engineering**Technology (1976)***James J. Flannery, MS**

Manager, Computer Applications, Boston Edison Company

*Lecturer, Electrical Engineering Technology (1980)***Donald W. Fogg, MSEE**

Senior Engineering Scientist, General Electric Company

*Associate Lecturer, Electrical Engineering**Technology (1989)***Mario R. Forziati, BET**

Field Applications Engineer, Emulex Corporation

*Associate Lecturer, Computer Technology (1990)***Constantine Fountzoulas, PhD**

Materials Research Engineer, US Army Materials Technology Laboratory

*Lecturer, Mechanical Engineering Technology (1985)***Richard J. Fox, MS**

Laboratory Supervisor, Northeastern University

*Lecturer, Mechanical-Structural Engineering**Technology (1986)***John J. Frazier, BS**

Retired

*Lecturer, Physics (1981)***Thomas G. Fratto, AM**

Mathematics Teacher, Cambridge Rindge and Latin School

*Lecturer, Computer Technology (1987)***Mable D. Gholar**

Electronic Technician, Northeastern University

*Associate Lecturer, Electrical Engineering**Technology (1990)***Bernard F. Goldstein, PhD**

Manager/Controls, Dynamics Research Corp.

*Senior Lecturer, Electrical Engineering**Technology (1974)***Boris Gommerstadt, PhD**

Consultant

*Lecturer, Mechanical Engineering Technology (1984)***Philip R. Haberstroh, MSED**

Registrar, Boston Latin School

*Lecturer, Mathematics (1981)***W. Dale Hall, SB, PhD**

Member, Technical Staff, MITRE Corp.

*Lecturer, Mathematics (1981)***Gerald D. Halstead, MSEE**

Technical Staff, GTE Government Systems Corp.

*Lecturer, Electrical Engineering Technology (1985)***Djamel Hamiroure, MS**

Teaching Assistant, Northeastern University

*Associate Lecturer, Mechanical Engineering**Technology (1991)***Francis R. Hankard, MS**

Retired

*Senior Lecturer and Course Consultant,**Physics (1946)***Lewis H. Holzman, MSCE, RLS**

Consultant, Computer Department, Stone & Webster Engineering Corp.

*Senior Lecturer, Computer Technology (1966)***Daniel H. Hornbarger, MS**

Director, Government Programming Systems

Division, Blue Cross of Massachusetts

*Lecturer, Computer Technology (1986)***Ronald L. Jackson, MS**

Senior Engineer, Missile Systems Division, Raytheon Co.

*Associate Lecturer, Electrical Engineering**Technology (1987)***Charles E. Jacob, MSED, MLS**

Retired

*Senior Lecturer, Physics (1967)***Michael E. Jammal, MS**

Principal Manufacturing Engineer, Modicon Incorporated

*Associate Lecturer, Manufacturing Engineering**Technology (1989)***John Joseph Joyce, MSED, MA**

Director of Mathematics, Winchester High School

Lecturer, Mathematics (1983)

John Kaczorowski, MSEE

Consultant

*Senior Lecturer, Electrical Engineering Technology (1970)***Stephen M. Kane, EdD**Associate Professor, Co-op Education,
Northeastern University*Lecturer, Mathematics (1987)***Amin Karimpour, MSEE**

Assistant Professor, Franklin Institute of Boston

*Associate Lecturer, Computer Technology (1989)***Robert D. Keenan, BSEE**Energy Services Manager, Braintree Electric
Light Dept.*Associate Lecturer, Electrical Engineering Technology (1989)***Edward V. Kelly**

Electronic Technician, Northeastern University

*Associate Lecturer, Electrical Engineering Technology (1991)***John G. Kelly, BS**

Associate, The Wyatt Co.

*Lecturer, Computer Technology (1983)***David E. Kentley**

President/Treasurer, Memory Management Inc.

*Lecturer, Electrical Engineering Technology (1985)***John J. Klein, MSEE**

Retired

*Senior Lecturer, Electrical Engineering Technology (1949)***Peter L. Kobs, MS**

Writing Consultant, Digital Equipment Corp.

*Associate Lecturer, Technical Communications (1987)***Joseph C. LaCroix, CAGS**Chair, Mathematics Department, Boston
Latin School*Senior Lecturer, Mathematics (1974)***James E. Lennox, MS**Member of Technical Staff, The Analytical
Sciences Corporation*Associate Lecturer, Computer Technology (1988)***Alvin J. Lesieur, MEd**

Training Director, Instron Corp.

*Senior Lecturer, Engineering Graphics (1965)***Demetre P. Ligor, MSEE, PE**

President, Applied Measurements, Inc.

*Senior Lecturer, Physics (1959)***John F. Limongelli, BSEE**

Consultant

*Associate Lecturer, Electrical Engineering Technology (1988)***Guido W. Lopez, MS**

Lecturer, Northeastern University

*Lecturer, Mechanical Engineering Technology (1988)***John F. Lutkevich, BBA**

Retired

*Senior Lecturer, Engineering Graphics (1956)***Michael R. MacNeil, BSBA**

Electronic Technician, Northeastern University

*Lecturer, Electrical Engineering Technology (1985)***Eliot A. Madow, BET**

Projects Director, Coopers & Lybrand

*Lecturer, Computer Technology (1985)***James T. McGrath, MA, MS, MS, MS**

Lecturer, Northeastern University

*Lecturer and Course Consultant, Mechanical Engineering Technology Laboratories (1986)***Carl J. Mellea, MS, PE (MA, ME, NH RI, VT)**Project Engineer, Howard, Needles, Tammen
& Bergendorff*Senior Lecturer, Mechanical-Structural Engineering Technology (1960)***Amie Miller, BA**Senior Technical Writer, Digital
Equipment Corporation*Associate Lecturer, Technical Communications (1991)***Vladislav Mlch**

Laboratory Technician, Northeastern University

*Associate Lecturer, Mechanical Engineering Technology (1991)***Nihar Mohanty, MS**

Teaching Assistant, Northeastern University

*Associate Lecturer, Environmental Engineering Technology (1992)***Louis A. Moore, BSCE, RLS**Chief Engineer, Commonwealth of Mass., Land
Court, Boston*Senior Lecturer, Mechanical-Structural Engineering Technology (1972)***Wassim G. Najm, PhD**Electronics Engineer, Volpe National Transportation
Systems Center*Lecturer, Electrical Engineering Technology (1985)***Yesugey Oktay, MS, PE (CA, MA, ME, NY)**Division Head, Mechanical & Structural
Engineering, Boston Edison Co.*Senior Lecturer, Mechanical-Structural Engineering Technology (1970)*

Masoud Olia, MS

Lecturer, Northeastern University
Lecturer, Mechanical Engineering Technology (1982)

Douglas J. Ordway, MEd

Computer Coordinator, Boston Latin School
Senior Lecturer, Computer Technology (1975)

Francis A. Pepicelli, BS

Engineer, Northrop Corp.
Senior Lecturer, Engineering Graphics (1976)

Walter J. Phinney, MBA

Engineering Manager, Raytheon Missile Division
Senior Lecturer, Engineering Graphics (1977)

Dominic A. Piccione, MS, PE (MA, VA)

Senior Engineer, Stone & Webster Engineering Corp.
Senior Lecturer, Mechanical Engineering Technology (1966)

Richard H. Pike, MBA

Lecturer, Northeastern University
Senior Lecturer, Industrial Engineering (1980)

Norman C. Poirier, MS, PE

Research Associate, Northeastern University
Senior Lecturer, Telecommunications (1966)

Dennis D. Poulin, MS

Senior Microwave Systems Engineer,
 Hewlett Packard
Associate Lecturer, Electrical Engineering Technology (1989)

Donald J. Poulin, BSIT, PE

Retired
Senior Lecturer, Electrical Engineering Technology (1970)

Daniel W. Pratt, MS

Mathematics Department, Boston Latin School
Senior Lecturer and Course Consultant, Mathematics through Pre-Calculus (1967)

Charles H. Price, Jr., MSEE

Technical Staff, MITRE Corp.
Senior Lecturer, Electrical Engineering Technology (1960)

Robert Rancourt, MSEE

Electrical Engineer, MITRE Corp.
Senior Lecturer, Mathematics (1984)

James F. Regan, MSCE, PE (CT, DC, FL, MA, ME, NH, NJ, NY, PA, RI, VA, VT)

President, J.F. Regan Engineers, Inc.
Senior Lecturer, Mechanical-Structural Engineering Technology (1972)

Edward P. Ricupero, MEd

Head of Mathematics Department, Everett
 High School
Lecturer, Mathematics (1983)

Robert J. Ritchie, BS

Rights, Permits, and Survey Supervisor, Boston
 Edison Co.
Lecturer, Engineering Graphics (1980)

Robert A. Rosenberg, ScD

Engineering Consultant, Stone & Webster
 Engineering Corp.
Senior Lecturer, Mechanical Engineering Technology (1983)

Eric A. Roy, MEd, MA

Senior Teacher, Don Bosco Technical High School
Senior Lecturer, Mathematics (1967)

Thomas E. Ruden, MS

Principal Engineer, Raytheon Co. Missile
 Systems Labs.
Senior Lecturer, Physics (1967)

Lawrence H. Ryan, MSEE

RD & E Section Manager, The Foxboro Company
Lecturer, Computer Technology (1985)

Annino D. Salvucci, AS

Mechanical Design Engineer, Self Employed
Lecturer, Engineering Graphics (1983)

Stephen Schwarm, BSEE

Senior Technical Consultant, Prime Computer Inc.
Lecturer, Computer Technology (1985)

John W. Shaw, AS

Field Service Engineer, Northeast Electronics, Inc.
Lecturer, Electrical Engineering Technology (1985)

Howard T. Shippen, MSEE

Consultant, Shippen Associates
Lecturer and Program Coordinator for Telecommunications (1987)

Ronald J. Skilton, BSc

Manager/Systems, Stone & Webster
 Engineering Corp.
Lecturer, Computer Technology (1983)

Joseph E. Steffano, Sr., MS, MBA, PE (CT, MA, ME, NH, NY, PA, RI, VT), RLS (CT, MA, ME, NH, RI, VT)

Chief Engineer, Stone & Webster Engineering Corp.,
 Structural Division
Senior Lecturer, Mechanical-Structural Engineering Technology (1965)

Harold J. Stengel, SB
Secondary Teacher in Mathematics, Boston
Latin School
Lecturer, Mathematics (1982)

Robert E. Stewart, BS
Software Engineer, Textron
Defense Systems
Associate Lecturer, Computer Technology (1991)

M. Carlton Storms, MEd
Teacher, Braintree High School
Senior Lecturer, Physics (1967)

Nabil S. Sukkar, MSCE
Director of QA, American Science and Engineering
*Lecturer, Mechanical-Structural Engineering
Technology (1984)*

Raimundas Sukys, MS
Retired
*Senior Lecturer, Electrical Engineering
Technology (1962)*

Donald M. Sullivan, MEd
Mathematics Teacher, Dedham High School
Lecturer, Mathematics (1984)

Paul A. Sullivan, BSET
Manager, New England Telephone
*Associate Lecturer, Electrical Engineering
Technology (1990)*

James Surette
Laboratory Supervisor, Northeastern University
Lecturer, Mechanical Engineering Technology (1990)

David G. Sveden, MEd
Mathematics Instructor, Town of Needham
Senior Lecturer, Mathematics (1979)

Jerome Tapper, BSEE
President, Electro-Mechanical Solution Consultants
Lecturer, Electrical Engineering Technology (1982)

Henry S. Teng, MS
Principal Software Engineer, Digital
Equipment Corporation
Associate Lecturer, Computer Technology (1990)

David K. Toebes, MSEE
Design Engineer, Raytheon Co.
Lecturer, Mathematics (1987)

Richard W. Torian, MEd
Chair, Mathematics Department, Ashland
High School
Senior Lecturer, Mathematics (1965)

John S. Travia, MSEE, PE
Retired
*Senior Lecturer, Electrical Engineering
Technology (1965)*

Edward P. Tribuna, BET, FAA, A&P Certificate
Software Services Consultant, Digital
Equipment Corporation
Lecturer, Electrical Engineering Technology (1985)

Daniel P. Truesdell, BS
Consultant, G.E. Consulting Services Corp.
Associate Lecturer, Computer Technology (1988)

Paul T. Tsang, MS
Mechanical Design Engineer, Metcalf & Eddy
*Lecturer, Mechanical Engineering
Technology (1988)*

John F. Videler, MS
Manager, Instrument Standards and Controls,
General Electric Co.
*Senior Lecturer, Electrical Engineering
Technology (1968)*

Joel R. Weinstein, BSEE
President, High Technology Marketing
Senior Lecturer, Computer Technology (1977)

James T. Welch, MS
Principal Engineer, Ungermann-Bass, Inc.
*Senior Lecturer and Course Consultant, Computer
Technology (1977)*

Albert P. Wickham, MSE
Professional Engineer, Self Employed
Associate Lecturer, Engineering Graphics (1991)

Albert G. Wilson, MS, PE, SE (IL)
Retired
*Senior Lecturer and Course Consultant, Mechanical
Engineering Technology (1948)*

Susan L. Wood, BSEE
Software Engineer, Ungermann-Bass, Inc.
Lecturer, Computer Technology (1984)

Bernie T. Woodrow, MS
Loss Control Consultant
*Associate Lecturer, Manufacturing Engineering
Technology (1992)*

Albert C. Yang, MS
Director, R & D, Sigma Design, Inc.
Associate Lecturer, Computer Technology (1991)

Walter Zagieboylo, MS, ME, PE, MAA
Retired
Senior Lecturer, Mathematics (1969)

Administration

Administrative Officers

Thomas E. Hulbert, MS, PE, *Director*
 Roy A. Dalsheim, BS, *Assistant Director*
 Rasma Galins, *Assistant Director*
 Rosanne L. Bogan, BS, *Staff Assistant*

Student Counseling Staff

David J. Allen, MSCE
 Boreslaw P. Berestecky, MEd
 Rosanne L. Bogan, BS
 Roy A. Dalsheim, BS
 Rasma Galins, *Administrative Coordinator*
 David S. Goldman, MS
 Stephen M. Kane, EdD
 Nonna K. Lehmkuhl, MEd, MS
 Ronald E. Scott, ScD

Committee on Regulation and Discipline

Thomas E. Hulbert, MS, PE, *Chair*
 Roy A. Dalsheim, BS
 Rasma Galins

Academic Standing Committee

Thomas E. Hulbert, MS, PE, *Chair*
 David J. Allen, MSCE
 Rosanne L. Bogan, BS, *Secretary*
 Roy A. Dalsheim, BS
 Rasma Galins
 David S. Goldman, MS
 Stephen M. Kane, EdD
 George F. Kent, MS, MBA, PE (CT, MA)
 Nonna K. Lehmkuhl, MEd, MS
 Ronald E. Scott, ScD

Academic Advisory Council

Thomas E. Hulbert, MS, PE, *Chair*
 Edward Bobroff, BSME
 Roy A. Dalsheim, BS
 Rasma Galins
 Francis R. Hankard, MS
 Nonna K. Lehmkuhl, MEd, MS

Industrial Advisory Committee

Frank Archambault, *Vice President, Norlite Corporation*
 Matteo Berardi, *Consultant*
 Paul Farris, *Consultant*
 Rasma Galins, *Assistant Director, School of Engineering Technology, Northeastern University*
 Robert Hayden, *Consultant*
 Daniel Hornbarger, *Director, Government Programs Systems, Blue Cross of Massachusetts*
 Robert Horowitz, *President and Chair, Hancock Machine Company*

Barbara Kane, *Director, Department of Computer Education, Natick Public Schools*

Peter Lillios, *President, International Totalizing Systems*

Melvin Mark, *Consultant*

Roger Miller, *Software Engineer, General Dynamics, Electric Boat Division*

Charles Price, *Technical Staff, Mitre Corporation*

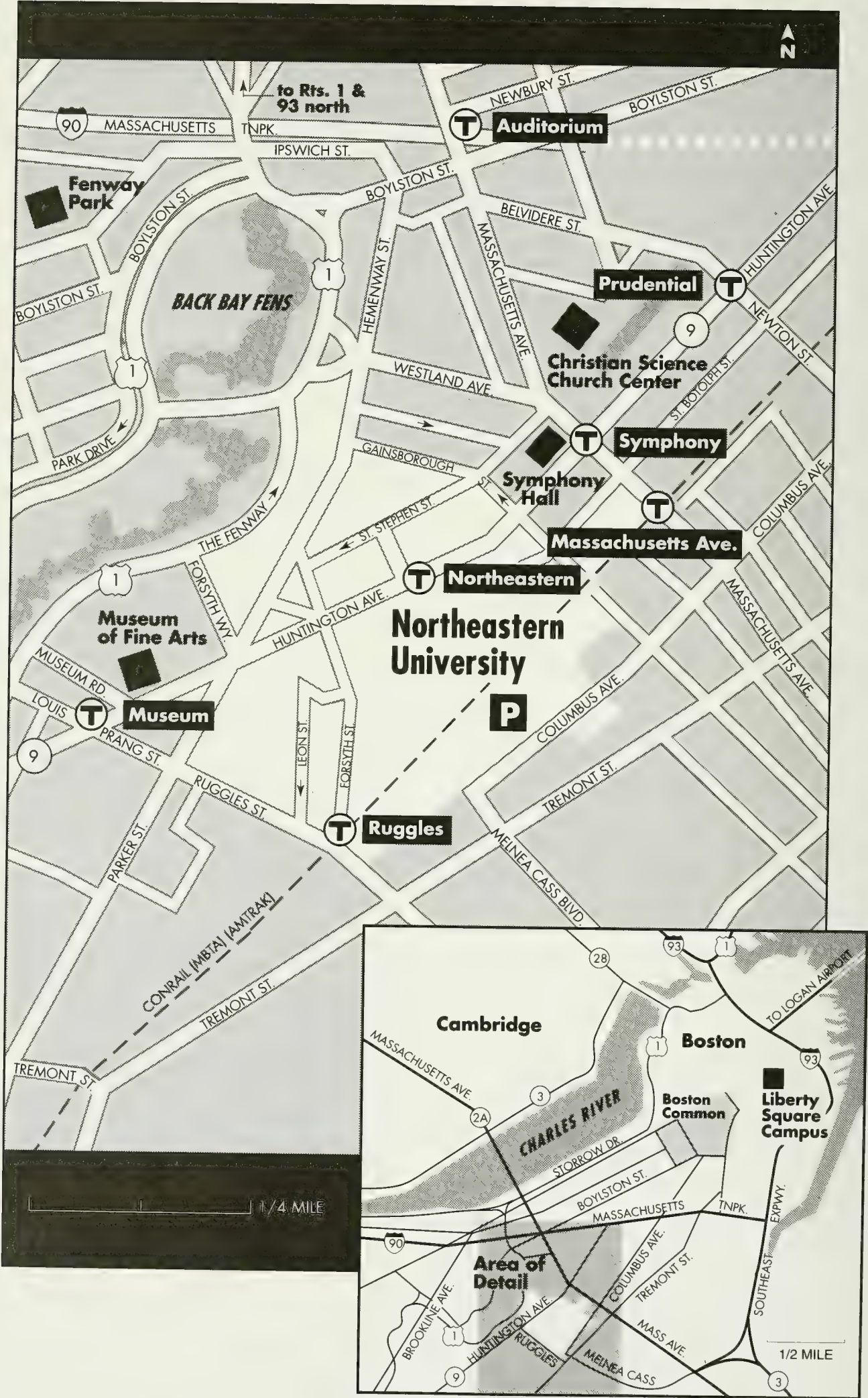
Jeffrey Ross, *Staff Director, Integrated Planning, New England Telephone Company*

Curriculum Advisory Committee

Thomas E. Hulbert, MS, PE (Academic Administration), *Chair*
 Rasma Galins, *Secretary*
 David J. Allen, MSCE (Program Consultant, Civil Engineering Technology Associate Degrees and Evening Programs) Mechanical-Structural Engineering Technology
 Rosanne L. Bogan, BS
 Robert W. Case, PhD (Course Consultant, Day Mathematics)
 Roger T. Connor, MEd (Course Consultant, Calculus and Differential Equations)
 Roy A. Dalsheim, BS
 Leonard F. Dow, MS, PE (Course Consultant, Circuit Analysis and Circuit Analysis Laboratories)
 David S. Goldman, MS (Program Consultant, Manufacturing Engineering Technology, Evening Program)
 Francis R. Hankard, MA (Course Consultant, Physics)
 Eric W. Hansberry, MS (Course Consultant, Engineering Graphics and Kinematics)
 George F. Kent, MS, MBA, PE (CT, MA) (Program Consultant, Mechanical Engineering Technology, Day and Evening Programs)
 Nonna K. Lehmkuhl, MEd, MS (Program Consultant, Computer Technology, Day and Evening Programs)
 James T. McGrath, MA, MS, MS, MS (Course Consultant, Mechanical Engineering Technology Laboratories)
 Daniel W. Pratt, MS (Course Consultant, First-Year Mathematics through Pre-Calculus)
 Ronald E. Scott, ScD (Program Consultant, Electrical Engineering Technology, Day and Evening Programs)
 Howard T. Shippen, MS (Course Consultant, Telecommunications)
 James Welch, MS (Course Consultant, Computer Technology Hardware Courses)
 Albert G. Wilson, MS, PE (Course Consultant, Mechanics)

Campus Maps

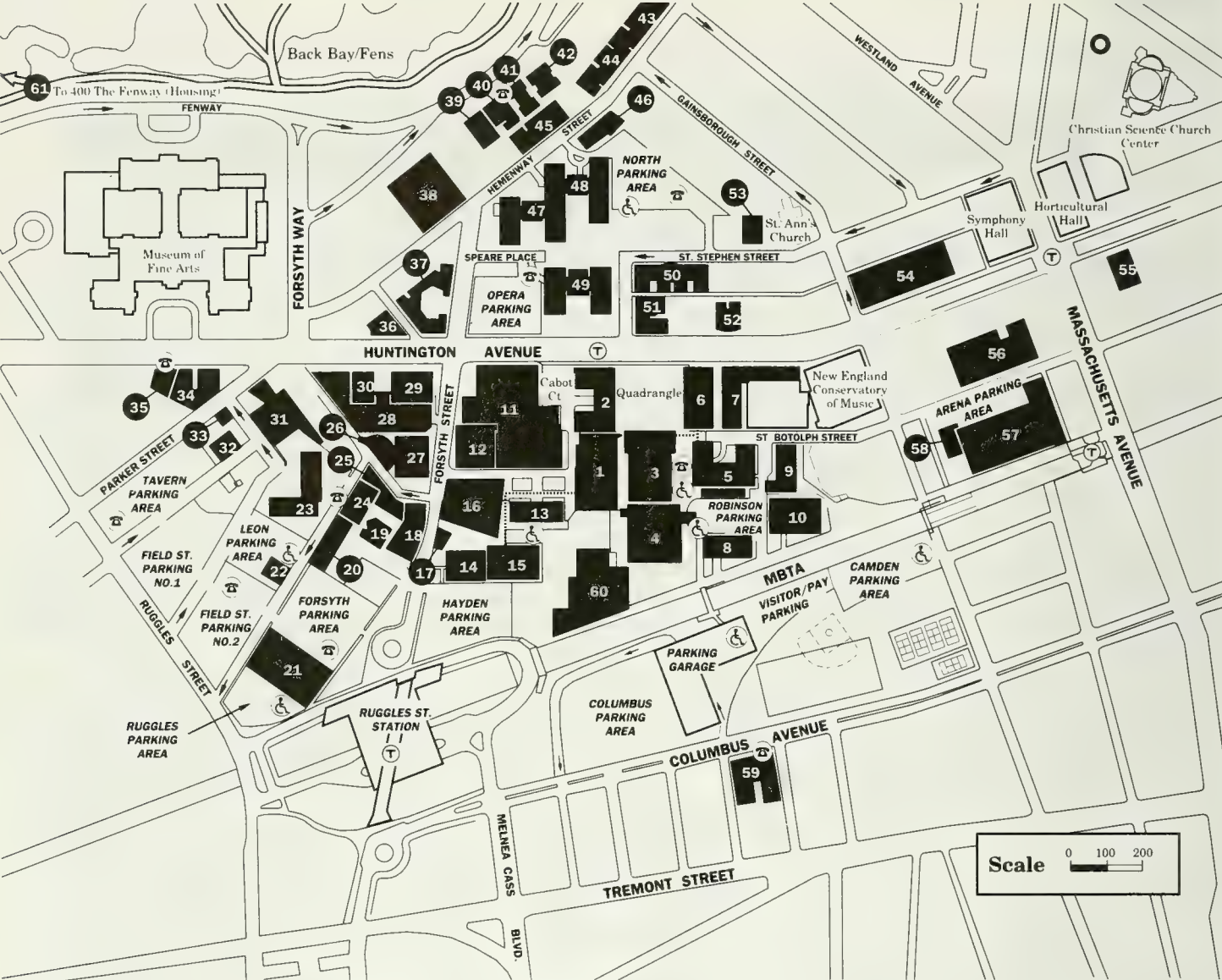
Access to Boston



Directions

From the North Route I-93 or Route 1	At the merge with Route 3 (the Southeast Expressway), take the Storrow Drive exit and proceed to the Fenway exit. Follow signs for Boylston Street Inbound, and bear right at Westland Avenue, which leads to Massachusetts Avenue. Turn right onto Massachusetts Avenue, proceed to the third traffic light, and turn right onto Columbus Avenue. The Northeastern University Parking Garage is less than one-half mile on your right at 795 Columbus Avenue.
From the West Route 90 Mass Turnpike	Take Exit 22 (Copley Square), and bear right. Proceed to the first traffic light and turn right on Dartmouth Street. Then take the next right onto Columbus Avenue. It is approximately one mile to the Northeastern University Parking Garage at 795 Columbus Avenue.
Route 9 Inbound	Proceed inbound on Route 9 until it becomes Huntington Avenue (approximately one-half mile after Brigham Circle), and take a right onto Ruggles Street. At the third traffic light turn left on Tremont Street, take the next left onto Columbus Avenue, and then turn right. The Northeastern University Parking Garage is two blocks on your left at 795 Columbus Avenue.
From the South Route 3 Southeast Expressway	Take Exit 18 (Massachusetts Avenue), and at the end of the ramp proceed straight onto Melnea Cass Boulevard. Continue for approximately two miles, and turn right onto Columbus Avenue. The Northeastern University Parking Garage is two blocks on your left at 795 Columbus Avenue.
By Public Transportation	Take the commuter rail to Ruggles Station, Back Bay Station, or North Station. From Back Bay Station, transfer to the outbound Orange Line (to Forest Hills) for two stops. Get off at Ruggles Station, which is on one side of the Northeastern University campus. From North Station, take any Green Line train to Government Center; transfer to the outbound "E" Green Line train; get off at the Northeastern University stop (the first stop above ground).

Main Campus



Academic and Service Buildings

- 22 African-American Institute (AF)
- 12 Barletta Natatorium (BN)
- 19 Boiler Plant
- 11 Cabot Physical Education Building (CB) **TTY:** Rm 110
- 39 Cahners Hall (CA) **TTY:** Rm 151
- 28 Cargill Hall (CG)
- 13 Churchill Hall (CH)
- 59 Columbus Place (716 Columbus Avenue) (CP)
- 56 Cotting School (CT)
- 9 Cullinane Hall (CN)
- 40 Cushing Hall (CU)
- 14 Dana Research Center (DA)
- 27 Dockser Hall (DK) **TTY:** Rm 107
- 6 Dodge Building (DB)
- 3 Ell Student Building (Auditorium) (EL) **TTY:** Rms 04, 104
- 4 Ell Student Center (Student Lounge) (EC) **TTY:** Rm 255
- 16 Forsyth Building (FR) **TTY:** Rms 100, 135
- 17 Forsyth Building Annex (FA)
- 38 Forsyth Dental Building (FE)
- 1 Hayden Hall (HA) **TTY:** Rms 120, 202
- 33 Hillel-Frager (HF)
- 24 Holmes Hall (HO) **TTY:** Rm 276
- 55 236 Huntington Avenue (HU)

- 7 316 Huntington Avenue (Northeastern at the YMCA) (BY)
- 54 Huntington Plaza (271 Huntington Avenue) (HN)
- 10 Hurtig Hall (HT)
- 26 Kariotis Hall (KA)
- 41 Kerr Hall (Faculty Center) (KH)
- 29 Knowles Center (KN)
- 25 Lake Hall (LA) **TTY:** Rm 203
- 57 Matthews Arena (MA)
- 58 Matthews Arena Annex (MX)
- 20 Meserve Hall (ME) **TTY:** Rm 305
- 5 Mugar Life Science Building (Peabody Health Professions Center) (MU)
- 18 Nightingale Hall (NI) **TTY:** Rm 125
- 31 Parker Building (PA)
- 2 Richards Hall (RI) **TTY:** Rms 150, 254
- 8 Robinson Hall (RB)
- 21 Ryder Hall (RY) **TTY:** Rms 170, 180, 251, 270
- 15 Snell Engineering Center (SN) **TTY:** Rm 120
- 60 Snell Library (SL) **TTY:** Reference Desk
- 50 122 St. Stephen Street (SS)
- 30 Stearns Center (ST) **TTY:** Rm 302
- 32 26 Tavern Road (TA)

Key

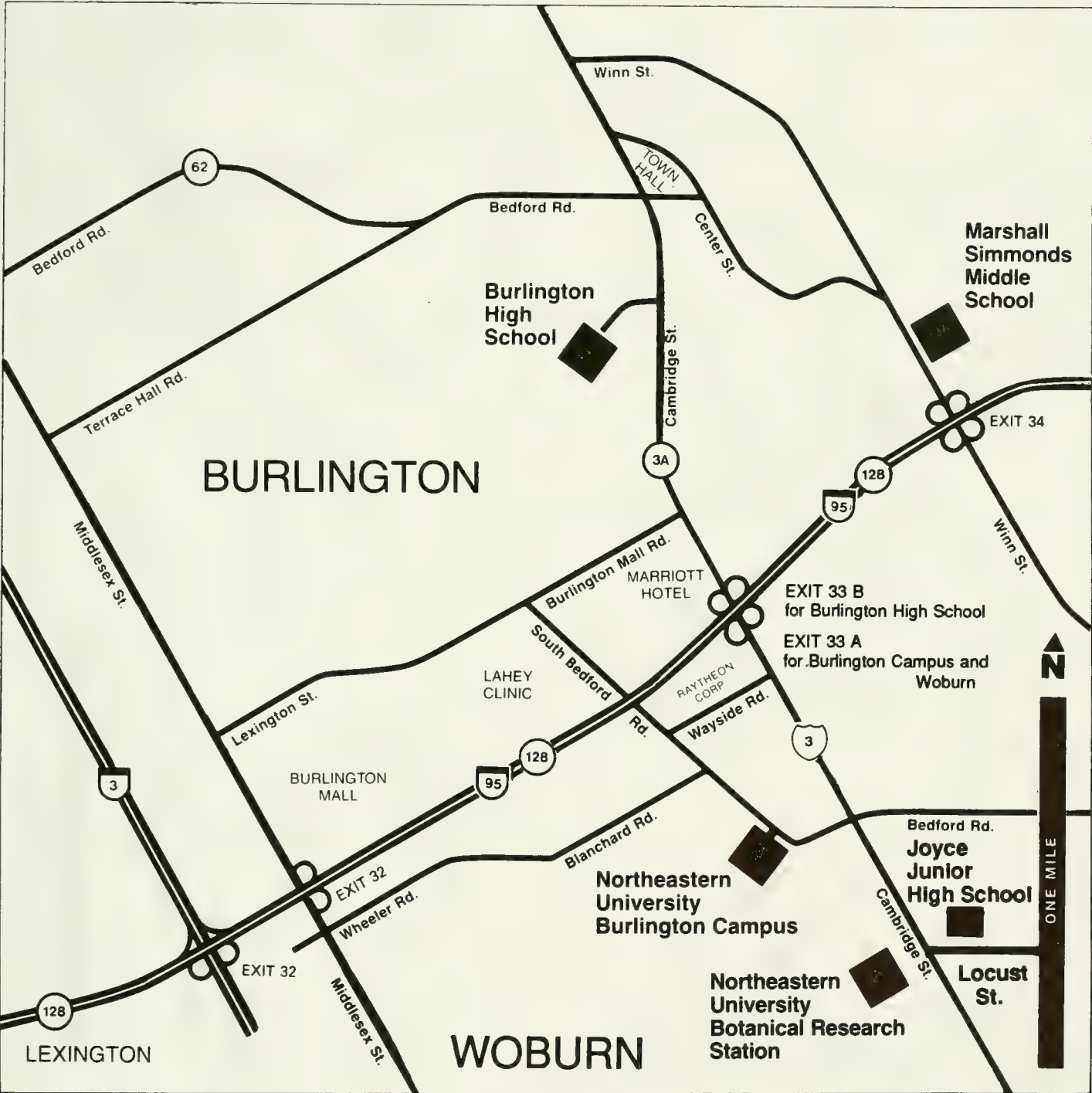
- Academic, residential, and service buildings
- Handicap parking
- Parking areas
- Street direction
- Underground tunnel
- Emergency telephone
- TTY locations
- See alphabetic list of buildings for **TTY** locations.

Maps are provided by the Information Center, 115 Richards Hall, extension 2736 (TTY extension 3768). Some buildings on this map are used but not owned by Northeastern University. 6/91

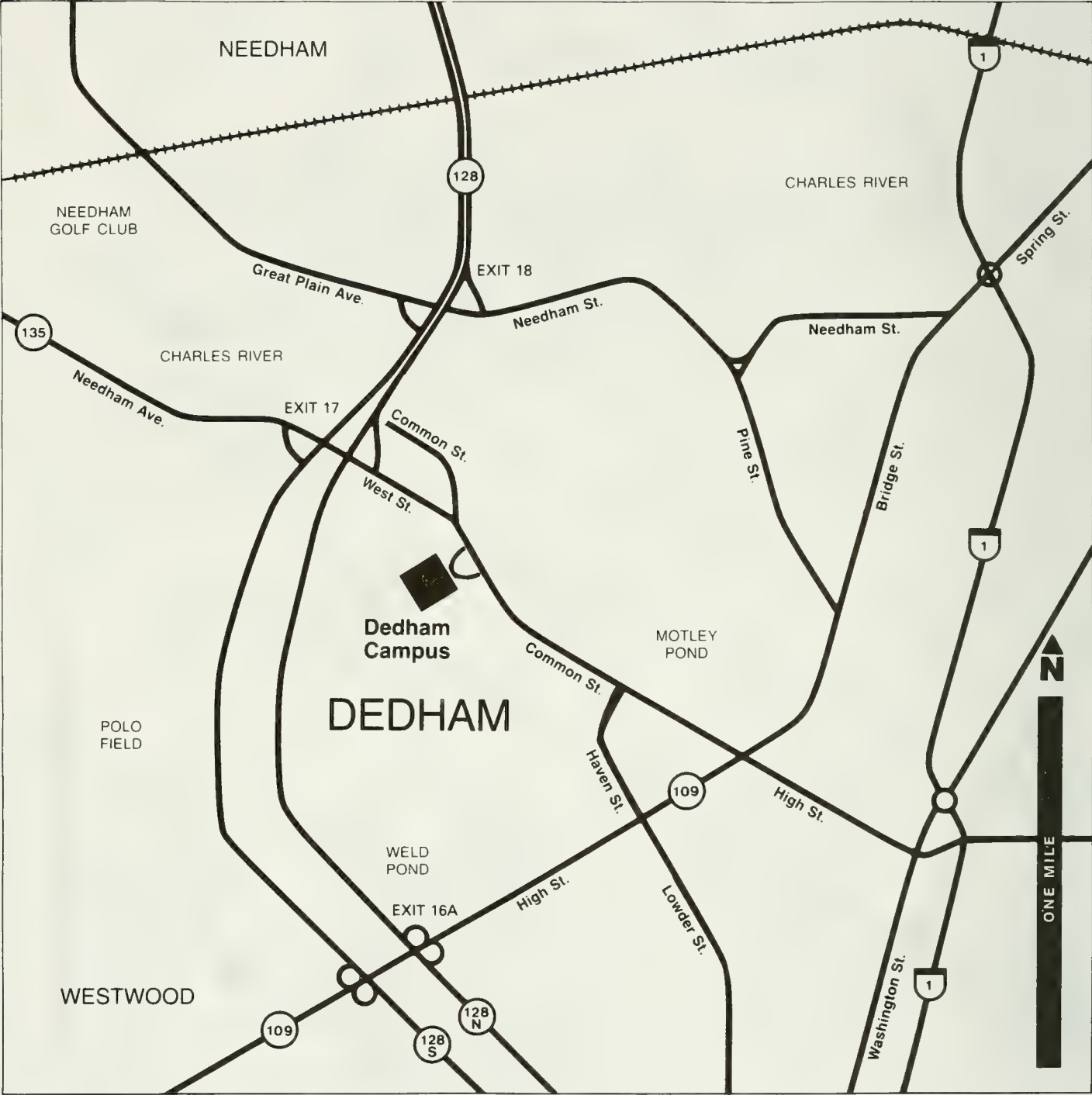
Residence Buildings

- 34 Burstein Hall
- 43 Kennedy Hall
- 46 142-148 Hemenway Street
- 45 153/157-163 Hemenway Street
- 7 316 Huntington Avenue (Northeastern at the YMCA)
- 52 319 Huntington Avenue
- 51 337 Huntington Avenue
- 36 407 Huntington Avenue
- 41 Kerr Hall
- 53 Light Hall
- 42 Melvin Hall
- 35 Rubenstein Hall
- 44 Smith Hall
- 49 Speare Hall
- 48 Stetson East **TTY** (public)
- 47 Stetson West
- 50 106/110/116/122 St. Stephen Street
- 23 Willis Hall
- 37 White Hall
- 61 400 The Fenway

Burlington



Dedham



Marlboro



WELLS BINDERY

MAY 13

WALTHAM, MA 02154
(617) 893-3050

